# EFFECTIVENESS OF VIRTUAL REALITY THERAPY UPON ANXIETY AND BLOOD PRESSURE AMONG PATIENTS UNDERGOING CABG

**By**

**SHEEBA.N**

**A DISSERTATION SUBMITTED TO THE TAMIL NADU DR.M.G.R.MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULLFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF**

**MASTER OF SCIENCE IN NURSING**

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# EFFECTIVENESS OF VIRTUAL REALITY THERAPY UPON ANXIETY AND BLOOD PRESSURE AMONG PATIENTS UNDERGOING CABG

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# DECLARATION

I hereby declare that the present dissertation entitled **"Effectiveness of virtual reality therapy upon anxiety and blood pressure among patients undergoing CABG"** is the outcome of the original research work undertaken and carried out by me under the guidance of **Dr. LathaVenkatesan, M.Sc (N)., M.Phil (N)., Ph.D (N).,M.B.A. (HM), Ph.D (HDFs)., Principal cum professor,** Apollo College of Nursing and **Dr.K.Vijayalakshmi.**, M.Sc(N), M.A.(Psy), Ph.D(N), H.O.D, Mental Health Nursing, Apollo College of Nursing, Chennai.

I also declare that the material of this has not found in any way, the basis for the award of any degree or diploma in this university or any other university.

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"Gratitude is a miracle of its own recognition. It brings out a sense of appreciation and sincerity of a being"

**-Auliq-Ice**

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# SYNOPSIS

An Experimental Study to Assess the Effectiveness of Virtual Reality Therapy upon Anxiety and Blood Pressure among Patients undergoing Coronary Artery Bypass Grafting at Selected Hospital, Chennai.

## Objectives of the Study

1. To assess the level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.
2. To determine the effectiveness of virtual reality therapy by comparing the pre and posttest scores of anxiety and blood pressure in control and experimental group of patients undergoing CABG.
3. To assess the level of acceptability of experimental group patients undergoing CABG regarding virtual reality therapy.
4. To determine the correlation between level of anxiety and blood pressure scores among patients undergoing CABG in pretest and posttest.
5. To find out the association between selected demographic variables and level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.
6. To find out the association between selected clinical variables and level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.

A conceptual framework is a group of concepts and a set of propositions that spell out the relationship between them. The purpose of conceptual framework is to make scientific findings meaningful and generalized. A conceptual framework deals with the interrelated concepts on abstractions that are assembled together in some

rational scheme by virtue of their relevance to a common theme. It helps to stimulate research and extension of knowledge by providing both direction and impetus. A framework may serve as a spring board for scientific advancement (Polit, 2008).

The conceptual framework for this study is based on **Modified Kings Goal Attainment Model (1981)**. According to Imogene King, nursing is defined as a process of action, reaction and interaction where by nurses and clients share information about their perception in nursing education. Through perceptions and communications, they identify the problem through which they set goals and take necessary action. Modified Kings Goal Attainment model is based on the interpersonal and social system including perception, judgement, action, reaction, interaction, transaction and feedback.

Data was collected through the self-administration method by using instruments (Demographic variable Proforma, Beck Anxiety Inventory, Proforma to record B.P and level of acceptability scale).

The study was conducted in Apollo Main Hospital, Nungambakkam from January 28$^{th}$ 2018 to April 5, 2018. The patients were randomized using systematic Simple Random Technique on the basis of selection criteria. The purpose and duration of the study was explained to the samples to obtain their cooperation and informed consent was taken from participants. Pretest was done by using Beck Anxiety scale and Proforma to record B.P from both group.

The patient was made to sit on the bed and asked to wear Cardboard glasses and then VR meditation sceneries were played through mobile application. They were followed the scenes one by one where the natural sceneries and boating were

displayed. The music's and the solar system gives audio effect to get more interest towards the relaxation. During preoperative period, virtual reality therapy was given in the morning at 8 am and evening at 4 pm before taking routine medications consecutively for 2 days. It was continued in their postoperative period for 2 days till they were shifted to ward. No intervention was provided to the control group. Posttest was done on 5$^{th}$ POD by using Beck anxiety scale and Proforma to record B.P from both groups respectively. Level of acceptability was obtained from experimental group of patients undergoing CABG.

**Major findings of the study**

- Majority of patients were males (93.33%, 80%) and their income was above 40000/month (76.67%, 66.67%) in control and experimental group respectively. With regard to other variables, they were aged between 61yrs to 71 yrs (23.33%, 46.67%), had higher secondary education (33.33%, 36.67%) and involved in business (33.33%, 40%) in control and experimental group respectively.
- Majority of patients had illness for less than 5 years (100%, 90%), no history of smoking (93.33%, 76.67%), had no history of alcoholism (86.66%, 80%), hospitalized for 5- 10 days (90%, 93.33%) in control and experimental group respectively. Around half of them, had hypertension (53.33%, 53.33%), not taking antihypertensive drugs (46.47%, 56.67%), body mass index was between 25- 29 (43.33%, 56.67%) and involved in moderate physical activity (46.47%, 46.67%), were vegetarian (66.67%, 53.33%) in control and experimental group respectively.
- Majority of patients had mild level of anxiety in control (86.66%, 90%) and experimental group (86.67%, 96.66%) in pretest and posttest.

- Majority of patients had normal diastolic B.P (83.33%, 83.33%) and had prehypertension in systolic B.P (46.67%, 50%) in experimental group in pretest and posttest. However, less than half of patients had prehypertension in systolic B.P (43.33%, 40%), had prehypertension in diastolic B.P (43.33%, 43.33%) in control group in pretest and posttest.
- Mean and the standard deviation of pre-test and post-test anxiety scores of control group of patients (M= 19.7& SD= 2.7, M= 19.17& SD= 2.33) is higher than the experimental group (M= 17.37 & SD= 3.99, M= 14.83 & SD= 3.29) which is statistically significant with a't' value of 5.59 at $p<0.001$. This can be attributed to the effectiveness of virtual reality therapy upon anxiety. Hence the null hypothesis **(Ho1)** "There will be no significant difference between pretest and posttest anxiety scores in control and experimental group of patients undergoing CABG" was rejected.
- Mean and standard deviation of systolic B.P in control group did not show any significant reduction in posttest (M121.33, SD 13.32), when compared with pretest (M121.3, SD 12.95). In experimental group also mean and standard deviation of systolic B.P did not show any significant reduction in posttest (M 122.66, SD 12.26), when compared with pretest (M 123.66, SD 12.63).
- Mean and standard deviation of diastolic B.P in control group did not show any significant reduction in posttest (M 76.3, SD 8.89), when compared with pretest (M 76, SD 8.55). In experimental group also mean and standard deviation of diastolic B.P did not show any significant reduction in posttest (M 65.33, SD 8.40), when compared with pretest (M 65.66, SD 8.20). Hence the null hypothesis **(Ho2)** "There will be no significant difference between

pretest and posttest B.P scores in control and experimental group of patients undergoing CABG" was retained.

- There was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control and experimental group in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho3)** "There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG" was retained.
- There was no significant association between selected demographic variables of control group and level of anxiety in pretest and posttest ($p>0.05$). Hence, the null hypothesis **(Ho4)** "There will be no significant association between the selected demographic variables and level of Anxiety in pretest and posttest of patients undergoing CABG" was retained.
- There was no significant association between selected demographic variables of experimental group and level of anxiety in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho4) "**There will be no significant association between selected demographic variables and level of Anxiety in pretest and posttest of patients undergoing CABG" was retained.
- There was no significant association between selected demographic variables of control group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho5)** "There will be no significant association between selected demographic variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.
- There was no significant association between selected demographic variables of experimental group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho5)** "There will be no significant association between

selected demographic variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

- There was no significant association between selected clinical variables of control group and level of Anxiety in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho6)** "There will be no significant association between selected clinical variables and level of anxiety in pretest and posttest of patients undergoing CABG" was retained.
- There was no significant association between selected clinical variables of experimental group and level of anxiety in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho6)** "There will be no significant association between selected clinical variables and level of anxiety in pretest and posttest of patients undergoing CABG" was retained.
- There was no significant association between selected clinical variables of control group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho7)** "There will be no significant association between selected clinical variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.
- There was no significant association between selected clinical variables of experimental group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho7)** "There will be no significant association between selected clinical variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

## RECOMMENDATIONS

- The study may be conducted with larger samples for generalization of the results.
- The study can be replicated in different settings.
- The same study can be conducted using other different forms of virtual goggle or oculus rift.
- A comparative study can be done using usual relaxation techniques and virtual reality therapy to assess the anxiety among various groups.
- A comparative study can be done to assess the effectiveness among various psychosocial intervention including Virtual Reality Therapy.
- A comparative study can be conducted between private and government settings.

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# CHAPTER I

# INTRODUCTION

## Background of the Study

***"Disease of the Heart is worse than the Disease of Body"***

***Imanali***

Cardio vascular disease has had great impact on the World Health Scenario. Cardio vascular disease is often impacting the most productive year of an individual's life. Coronary Artery Bypass Graft Surgery (CABG) is an important treatment for the patients with coronary artery disease to reduce the risk of further complication and enhance the quality of life. The role of CABG is being evaluated as a consequence of new technologies, both in coronary surgery and in percutaneous coronary intervention (Kirklin et al 1991; Caines et al 2004).

CABG improves prognosis in the early post-surgical years in the clients with symptomatic Left Main Coronary Artery Stenosis or Triple Vessel Disease, this is not significant after 10-12 years. Furthermore, cardiac surgery has advanced to the level where mortality rates have reduced dramatically. Approximately, 1150 CABG surgeries performed every year in multispecialty hospitals (Ferguson et al 2002).

Anxiety is a common reaction to a stressful situation and unpleasant experience that disturbs the patients, physically and psychologically. Anxiety accompanies numerous emotional conditions and factors such as patient's age, sex, their underlying physical and mental well-being, the type of surgery, previous experiences with surgical procedures. When anxiety level increases, there is an elevation in heart rate and B.P (Stewart, 2010).

The major changes in a general routine lifestyle also provoke anxiety in the individuals. Certainly, some sort of anxiety is experienced by all of us frequently in our life in the situations of joy and sorrow. The importance of anxiety as a powerful influence in contemporary life is increasingly recognized and manifestations of the current concern with anxiety phenomenon are reflected in literature, arts, science of our culture. The anxiety seems to be the leading fact in modern life. Not merely the black statistics of alcoholism, murder suicide, and divorce anxiety, but almost any act in our daily life has connection with some sort of anxiety (Charles, 1975).

The nervous feeling before an important life event or during a difficult situation is a natural echo of the original fight or flight reaction. It can still be essential to survival. When facing a potential harmful or worrying triggers or anxiety are not a normal feeling.

The reasons for anxiety while undergoing major cardiac surgery may be due to fear and anxiety on the outcomes of the surgery as a vital organ, the heart, is involved. While waiting for major heart surgery significant physical and psychological stressors, including higher anxiety, uncertainties, depression, and worries regarding outcome of surgery may even lead to pain, shortness of breath, and alteration in vital signs. These factors are aggravating the symptoms of existing disease and can lead to complicated recovery after the surgery (Guo, East & Arthur, 2012).

Virtual Reality Therapy is a Relaxation technique that helps patients with various psychological problems. The obvious advantages of Virtual Reality Exposure Therapy have made it more desirable in the field of treatment. Virtual Reality Therapy can be conducted from anywhere in the world, so those who are not able to reach the technology mobility issues virtual reality can be brought to them. Another major advantage is fewer ethical concerns than in-vivo exposure therapy.

The broader concepts of anxiety have a scope for extensive researchers on various aspects. Anxiety causes alteration in the adrenomedullary system which secretes catecholamine and is also responsible for cardiovascular changes. A pathologic consequence of anxiety affects a person as a whole. If a useful guideline is followed in various aspects of patients care, it may help patient to deal with their anxiety and thereby stabilization in various physical parameters like heart rate, B.P, respiratory rate, etc.

## Need for the Study

Globally, Coronary vascular disease (CVD) is the leading cause of death in all World Bank regions. CVD death occurs about 80 percent in low and middle income countries, the death rates for most regions are still below the rate for high income countries, which is around 320 per 100000 persons annually. A marked exception there in Europe and Central Asia, which has a rate of 690 CVD deaths per 100000 populations (WHO, 2007).

In USA, one in every three adults have one or more CVD and the total number of patients undergone cardio vascular surgeries have increased 33% in the last decades which numbered for around 500 billion a year for coronary vascular disease and 155 billion for hospitalization. Thereby, approximately one million hospitalizations and around 30% of deaths are due to coronary artery disease in Brazil. It is also the number one cause of death among the adulthood. Although, less invasive clinical treatment has made the approach to individuals with cardio vascular diseases, the cardiac surgeries are the intervention taken in some of cardiovascular diseases and it aims to improve patient's life expectancy and life quality.

CABG is the most commonly performed surgery throughout the world, with an annual estimate of 6,86,000 CABG surgeries have been performed (2013) in the United

States. The annual number of CABG surgeries in England was about 20,000 in United Kingdom (Williams, Rayner, & Townsend, 2015). In South Africa, approximately 8,400 coronary bypass operations are performed per year (The Heart & Stroke Foundation, 2016).

In India, in 2011, around 100 thousand cardiac surgeries were performed in and 170 centers around are in Brazil. Patients those who have undergone cardiac surgeries are likely to develop some complications before and after the operation such as pain, anxiety, stress, respiratory complications, depression. These complications are main causes for mortality and morbidity after a cardiac surgery, prolonged length of hospital stay and increases in cost. Coping responses reflect the thoughts and activities that people use to manage stressful situations.

Currently, India has a higher incidence of CAD and CABG surgeries as compared to other countries in the world. Although there are some previously published studies on assessment of preoperative anxiety among CABG surgeries from various countries. In 2010, the annual number of CABG surgery in India was about 60000 and in 2012 the number was about 1.5 lakhs (International Journal of Africa Nursing Sciences, volume 7, 2017).

CABG patients who are undergoing for the surgery experience high level of anxiety. Fear of dying before, rather than during surgery, has been highlighted in an anxious preoccupation. Thus anxiety manifests with autonomic alteration which exacerbate in CAD. After surgery, while anxiety may decrease below comparing pre-operative levels, but still exists and does not go beyond subclinical level. Like depression, complicating and accurate identification of anxious patients over the course of surgery recovery is the finding that autonomic-arousal symptoms significantly increase after

CABG. This is hardly given the overlap and seemingly indistinguishable nature of coronary disease and somatic symptoms.

Freud (2010), states anxiety as an emotional state that included feelings of apprehension, tension, nervousness, and worry accompanied by physiological arousal by some unwanted events.

Virtual Reality Therapy is one of the most commonly used interventions nowadays in the field of research which plays an important role in improving various psychological conditions by engaging patient in the virtual reality to recognize their physical presence before the behavioral performance. Studies have proved that Virtual Reality Therapy has an enormous effect on relieving anxiety related symptoms to a great extent during treatment phases or during palliative treatment phase for the dying.

Virtual Reality Therapy has also proven to be effective in rehabilitation of patients suffering from neglect. However, Virtual Reality Therapy can be done from anywhere in the world if given the necessary tools. There are many individuals who require therapy due to various forms of immobilization.

Therefore, the understanding of the nature of illness and how to deal with the problems are essential for the patients. The Virtual Reality Therapy plays a vital role to reduce the anxiety and B.P of preoperative CABG patients to reduce the complication and enhance the quality of life.

Even though there are studies conducted in western countries and other parts of India, there is paucity of research in this area in Tamil Nadu. Hence, the study is undertaken by the researcher to assess the effectiveness of Virtual Reality Therapy upon anxiety and B.P among patients undergoing coronary artery bypass grafting.

## Statement of the Problem

An experimental study to assess the effectiveness of virtual reality therapy upon anxiety and blood pressure among patients undergoing Coronary artery bypass grafting at selected hospital, Chennai.

## Objectives of the study

1. To assess the level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.
2. To determine the effectiveness of virtual reality therapy by comparing the pre and posttest scores of anxiety and blood pressure in control and experimental group of patients undergoing CABG.
3. To assess the level of acceptability of experimental group patients undergoing CABG regarding virtual reality therapy.
4. To determine the correlation between level of anxiety and blood pressure scores among patients undergoing CABG in pretest and posttest.
5. To find out the association between selected demographic variables and level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.
6. To find out the association between selected clinical variables and level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.

## Operational Definitions

### Effectiveness

### Conceptual Definition

It is the degree to which objectives are achieved and the extent to which targeted problems are solved.

### Operational Definition

In this study it refers to the significant reduction of anxiety and B.P as measured by Beck Anxiety Inventory (BAI) for Anxiety and Sphygmomanometer for B.P in pretest and posttest of patients undergoing CABG.

### Virtual Reality Therapy

### Conceptual Definition

It is the simulation in real or imaginary world which can be explored and interacted by a person.

### Operational Definition

In this study, Virtual Reality Therapy was provided to the patients undergoing CABG by using Virtual Reality Headsets to generate the realistic images, sounds and other sensations that replicate a real environment. It was provided for 4 consecutive days (2 days before and 2 days after CABG surgery except on the day of surgery) for 15 minutes twice a day.

### Anxiety

### Conceptual Definition

Anxiety is defined as an uncontrollable feeling of nervousness or worry about something that is happening or might happen in future.

**Operational Definition**

In this study, anxiety was uncontrollable feeling of nervousness perceived by the patient undergoing CABG as measured by Beck Anxiety Inventory.

**Blood Pressure**

**Conceptual Definition**

Blood pressure refers to the force originating in the pumping action of the heart exerted by the blood against the walls of the blood vessels.

**Operational Definition**

In this study, the B.P was measured by sphygmomanometer in the left arm of the patient in pretest and posttest.

**Acceptability**

**Conceptual Definition**

It is the quality of being tolerated or accepted of some action.

**Operational Definition**

In this study, acceptability refers to the recognition and approval of that was attained by patients undergoing CABG which was measured by acceptability rating scale.

**CABG Patients**

**Conceptual Definition**

Coronary artery bypass grafting is a form of bypass surgery that can create new routes around narrowed and blocked coronary arteries.

**Operational Definition**

In this study, preoperative CABG patients refers to those patients who were undergoing CABG surgery at selected hospital, Chennai.

## Null Hypotheses

**$H_o$1:** There will be no significant difference between pretest and posttest anxiety scores in control and experimental group of patients undergoing CABG.

**$H_o$2:** There will be no significant difference between pretest and posttest B.P scores in control and experimental group of patients undergoing CABG.

**$H_o$3:** There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG.

**$H_o$4:** There will be no significant association between selected demographic variables and level of anxiety in pretest and posttest of patients undergoing CABG.

**$H_o$5:** There will be no significant association between selected demographic variables and level of B.P in pretest and posttest of patients undergoing CABG.

**$H_o$6:** There will be no significant association between selected clinical variables and level of anxiety in pretest and posttest of patients undergoing CABG.

**$H_o$7:** There will be no significant association between selected clinical variables and level of B.P in pretest and posttest of patients undergoing CABG.

## Assumptions

- Anxiety is a very common emotional experience.
- There is a high level of Anxiety in all preoperative patients.
- Anxiety is an unpleasant stimuli experienced by preoperative patients.
- Anxiety will affect the physiological and psychological well-being of the individuals.
- Virtual reality therapy creates stimulation of people and environment.
- Virtual reality therapy has been used to manage distress associated with the medical procedure.

## Delimitations

1. Data collection period was limited to 6 weeks only.
2. Patients who were present in selected hospitals of Chennai during the time of data collection where considered for sampling.

## Conceptual Frame Work

A conceptual framework is a group of concepts and a set of propositions that spell out the relationship between them. The purpose of conceptual framework is to make scientific findings meaningful and generalized. A conceptual framework deals with the interrelated concepts on abstractions that are assembled together in some rational scheme by virtue of their relevance to a common theme. It helps to stimulate research and extension of knowledge by providing both direction and impetus. A framework may serve as a spring board for scientific advancement (Polit and Beck, 2016).

The conceptual framework for this study is based on **Modified Kings Goal Attainment Model (1981)**. According to Imogene King, nursing is defined as a process of action, reaction and interaction whereby nurses and clients share information about their perception in nursing education. Through perceptions and communications, they identify the problem through which they set goals and take necessary action. Modified Kings Goal Attainment model is based on the interpersonal and social system including perception, judgement, action, reaction, interaction, transaction and feedback.

### Perception

A person inputs energy from the environment. The study assumes that there is interpersonal relationship between nurse researcher and the participants. In the study perception, anxiety is an emotional experience by the participants preoperatively and there is a need for reduction in the level of anxiety and blood pressure by Virtual reality

therapy. Participants perception is that it imposes a demand among patients undergoing CABG with anxiety, to undergo Virtual Reality Therapy to reduce their level of blood pressure.

**Judgement**

Analyzing the area of action to be carried out. In this study, judgement of the nurse researcher refers to the decision that Virtual reality therapy may reduce the level of anxiety and blood pressure among patients undergoing CABG. On the other hand, the participants will agree to undergo Virtual reality therapy to control anxiety and blood pressure.

**Action**

The individual experts perceived energy as demonstrated by observable behavior, by taking mental or physical action. In this present study, action of the nurse researcher is to provide virtual reality therapy. Similar the participants action is needed for virtual reality therapy.

**Reaction**

Reaction means developing action on perceived choices for goal attainment. In this study, reaction refers to the action of both the nurse researcher and participants i.e, expression of willing in the Virtual reality therapy.

**Interaction**

Interaction refers to verbal and nonverbal behaviors between an individual and the environment or among two or more individuals. In this study, interaction means it involves goal directed perception and communication. Here interaction refers to the expression of satisfaction by participants on the virtual reality therapy.

**Transaction**

Imogene King said that transaction is the process where the two individuals naturally identify goals and means to achieve them. They reach agreement about how to attain these goals and then set about to realize them. In this present study, transaction is the reduction in the level of anxiety and blood pressure after Virtual reality therapy.

**Feedback**

The outcome may either be satisfactory or unsatisfactory reduction in the level of anxiety and blood pressure posttest Virtual reality therapy, satisfactory reduction indicates the Virtual reality therapy is effective and unsatisfactory reduction in blood pressure level leads to rearrangement of prior situation by the nurse researcher where the total process is recycled.

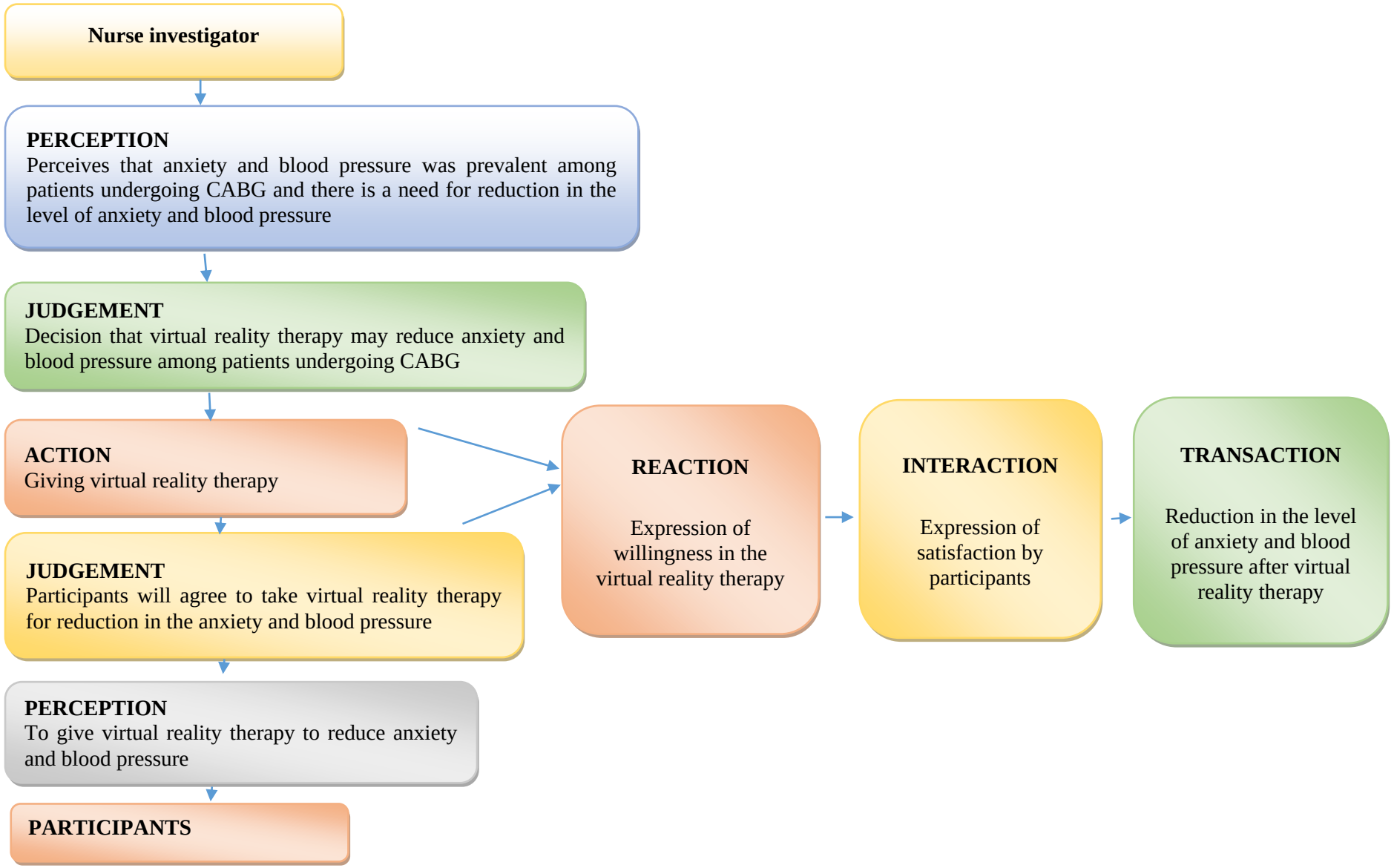


**Fig 1: Conceptual Framework based on Modified Kings Goal Attainment Model (1981)**

## Projected Outcome

The projected outcome of the study is to reduce the level of anxiety and blood pressure among patients undergoing CABG after Virtual reality therapy.

## Summary

This chapter has dealt with the introduction which included background of the study, need for the study, statement of the problem, objectives of the study, operational definitions, assumptions, null hypotheses, delimitations and conceptual framework and projected outcome of the study.

## Organization of the Report

**In Chapter- II** **:** Review of Literature

**In Chapter –III** **:** Research methodology- which includes research approach, Design, setting, population, sample and sampling techniques, tool Description, content validity of tools, pilot study, intervention Protocol, data collection procedure and plan for data analysis.

**In Chapter- IV** **:** Analysis and interpretation of the data and presented in terms of Descriptive and inferential statistics

**In Chapter- V** **:** Discussion

**In Chapter-VI** **:** Summary, Conclusion, Nursing Implication and Recommendations.

# CHAPTER II

# REVIEW OF LITERATURE

Review of literature helps the researcher to build on existing work he or she should understand what is already known as topic (Polit and Beck, 2016).

Review of literature helps to plan and conduct the study in systematic manner. Review of literature is the task of reviewing literature which involves the identification, selection, critical analysis and reporting of existing information on the topic of interest. It provides the basis to locate the data, new ideas that need to be included in the present study. It helps the researcher to find the accurate data that could be used for supporting the present findings and drawing conclusion.

Review of literature is presented under the following headings:

- Studies related to Overview of CABG Surgery
- Studies related to Virtual Reality Therapy
- Studies related to Effectiveness of Virtual Reality Therapy upon Preoperative Anxiety
- Studies related to Blood Pressure

## Studies related to Overview of CABG Surgery

Elkassas et al (2018) conducted a study on chronic total coronary artery occlusions, prevalence, mortality and morbidity post CABG and its prognosis. The study was conducted from 2011 to 2014 and got 940 patients for CABG procedure. They reported that there is a high success rate of Revascularizing the CTO coronary artery by surgical

grafting, the mortality after CABG of suck patients is not significantly different from the non CTO patients, but the morbidity is much higher and prognosis is worse.

The study was conducted by Sun et al (2018) about prevalence and long term survival after coronary artery bypass grafting in women and men with heart failure and preserved versus reduced ejection fraction. A retrospective cohort study conducted with 40083 patients, 55% had preserved ejection fraction without heart failure, 25.7% had reduced ejection fraction without heart failure. They reported that higher prevalence and poorer prognosis of heart failure of preserved ejection fraction.

Babaei et al (2018) conducted a study about the effect of Aloe Vera ointment on wound healing of CABG surgery in diabetic patients. A random clinical trial with intervention consisting of 60 diabetic patients attended to Iman Hospital for CABG surgery. They concluded that 2% Aloe Vera ointment can speed up the healing of wound of CABG surgery in diabetic patients after at least one week.

Ederoth et al (2018) conducted a study about cyclosporine pretest CABG does not prevent post-operative decreases in renal function. A randomized clinical trial consisting of 154 patients with estimated glomerular filtration rate of 15 to 90 ml/min. Study patients randomized to receive 2.5 mg /kg cyclosporine or placebo intravenously before surgery. They concluded that administration of cyclosporine did not protect CABG patients from acute kidney injury. Instead, cyclosporine caused a decrease in renal function compared to placebo but resolved after 1 month.

Hweidi et al (2017) conducted a study about prevalence of depression and its associated factors in patients post CABG surgery. A cross sectional study consisting of 143 patients who underwent CABG to determine the depression level and its correlation

experienced by post CABG patients after being discharged from cardiac intensive care units and the interpretation is patients who received their information about CABG surgery from nurses had lower level of depression. They concluded that the post coronary artery bypass graft patients who experienced an early onset depression required more attention to highlight the importance of supportive interventions.

Ponomarev et al (2017) conducted a study on prevalence and implications of abnormal respiratory pattern in cardiac surgery. A prospective cohort study consisting of 454 patients who have done pulmonary function test before surgery. They concluded that abnormal respiratory pattern is common and often underdiagnosed in the cardiac surgery settings. Pulmonary function tests help reveal patients at risk of complications may provide an opportunity for intervention.

Ramesh et al (2017) conducted a study about preoperative anxiety in patients undergoing CABG. A cross- sectional study consisting of 140 patients undergoing coronary artery bypass graft surgery were included in the study using a convenience sampling technique in a tertiary care referral hospital. The date was collected using state-trait anxiety inventory. They concluded that most of the patients had preoperative anxiety after CABG surgery.

Waite et al (2017) conducted a study about home based preoperative rehabilitation to reduce hospital length of stay for frail patients undergoing CABG. A prospective study, a single exploratory clinical pilot designed to assess and treat patients identified as frail who have been listed for CABG. The study conducted with 36 preoperative CABG patients. Finally, they concluded that small exploratory evaluation suggests that providing a home based PREHAP programme for frail patients undergoing CABG may able to improve functional ability and reduce hospital stay.

Kabeer et al (2016) conducted a study on outcomes of coronary artery bypass grafting in south Asian patients. 1970 patients underwent elective CABG at the Aga Khan University hospital, Pakistan were selected and the prospectively collected data was analyzed retrospectively including univariate and multivariate analysis. They concluded that trend of higher mortality in female patients was comparable to most studies done on Caucasian patients.

Lamy et al (2016) conducted a study about five year outcomes after off-pump or on-pump Coronary Artery Bypass Grafting. A prospective study had conducted with 4752 patients who had coronary artery disease were randomly undergo off-pump or on-pump CABG. They concluded that the rate of the composite outcome of death stroke, myocardial infarction, renal failure, or repeat revascularization at 5 years follow up was similar among patients who underwent off-pump CABG and those who underwent on-pump CABG.

**Studies related to Virtual Reality Therapy**

Debika et al (2017) conducted a study about effectiveness of virtual reality therapy upon somatic distress among cancer patients. It is unpublished dissertation which was submitted to Tamilnadu Dr. MGR University. An experimental study was conducted with 60 cancer patients in selected multispecialty hospital, Chennai. The comparison of post scores of stress of patient in the control group and experimental group among cancer patients and also shows a statistically significant difference in the study. They reported that virtual reality therapy was effective upon somatic distress among cancer patients.

Roxana et al (2017) conducted a study about virtual reality exposure therapy in flight anxiety. A quantitative meta-analysis of 11 randomized studies, they examined the potential moderators of the efficacy of interventions. They concluded that similar efficacy

between VRET and exposure based interventions showed better treatment over time when using VRET and exposure based intervention.

Nielsan et al (2017) conducted a study about comparison of body positions in virtual reality mirror box therapy for treatment of phantom limb pain in lower limb amputees. The games are displayed in VR using a head mounted display and two motion controllers attached to the intact bag. Two games were developed which both include sitting and lying version with the purpose of testing the possibilities for enabling more freedom of leg movement. The games were tested on 8 healthy subjects to compare the sitting and lying versions. They reported that the lying position was preferred in one game, whereas the sitting position was preferred in other game and it can enable more freedom of movement.

A study was conducted by Mosso et al (2017) about gender differences in VR Therapy response in California. The cohort study design used to demonstrate the efficacy of VR treatment and safety of the method and detection of differences in the responses based on gender. There were 22 patients, composed of 7 women and 15 men underwent cardiac surgical interventions. They were given VR before and immediately after the surgery. Virtual Reality scenarios were presented through Head Mounted Display (HMD) that displayed through 3D stereoscopic color images. They concluded that investigation of gender in pain threshold detected significantly lower tolerance in female than males.

Freeman et al (2017) conducted a study about virtual reality in the assessment understanding and the treatment of mental health disorders. A systematic review of empirical studies was conducted with 285 patients, in that 85 concerning assessment, 45 theory development, and 154 treatments. They concluded that the capability of VR to stimulate reality could greatly increase access to psychological therapies, while treatment outcomes could be enhanced by the technology ability to create new realities.

Kimon et al (2017) conducted a study on effect of an immersive preoperative virtual reality experience on patient reported outcomes. A randomized controlled trial was conducted with 127 patients undergoing cranial and spinal operations in a tertiary referral center. Patients are randomized to an immersive preoperative VR experience or standard preoperative experience stratified on type of operation. They concluded that patients exposed to preoperative VR had increased satisfaction during the surgical encounter and enhances the preoperative experience.

Viera et al (2016) conducted a study about virtual reality upon body composition and lipid profile and eating patterns on home based cardiac rehabilitation programme in Portugal. A randomized control trial used and subjects were randomly assigned as intervention group and control group. They were receiving education concerning cardiovascular risk factors during 6 months' period. Beyond the baseline, at 3 and 6 months the body composition was assessed with a bio impedance scale and a tape-measure, eating patterns with the semi-quantitative food frequency questionnaire and three months later, the intervention group revealed significant improvement in the waist-to-hip ratio posttest 6 months when compared with the control group. The intervention group also decreased their ingestion of total fat posttest six months and increased the high-density lipoprotein cholesterol 3 months after the programs conclusion. The virtual reality format had a positive influence on body composition, specifically on the waist-to-hip ratio, in the first three months.

Lohse et al (2014) conducted a study about virtual reality therapy for adult's post stroke population. A systemic review and meta-analysis exploring virtual reality environments and commercial games in therapy were systematically searched from the earliest available date till April 4, 2013. Twenty-six studies met the inclusion criteria. They

concluded that there was a significant benefit of VR therapy compared to conventional therapy.

**Studies related to Effectiveness of Virtual Reality Therapy upon Preoperative Anxiety**

Ganry et al (2018) conducted a study on using virtual reality to control operative anxiety in ambulatory surgery patients. The stress levels were assessed before and after this experience by making use of a visual analog scale, by measuring salivary cortisol levels, and by determining physiological stress based on heart coherence scores. They concluded that VR may provide an effective complementary technique to manage stress in surgery patients.

Robertson et al (2017) conducted study on effect of virtual reality therapy in reducing preoperative anxiety in patients prior to the arthroscopic knee surgery. A randomized control trial was used with 60 patients. Anxiety scores (hospital anxiety and depression scale), galvanic skin response, heart rate and B.P were measured pre and post intervention. An experimental group received video slide show of beaches around the world and the VR group experienced a virtual beach immersion. In conclusion, distraction using VR and IPad temporarily reduces self-reported anxiety levels and GSR measures compared to standard care in patients prior to knee arthroscopy.

Mosso et al (2017) conducted a study about virtual reality pain distraction during gynecological surgery. A report of 44 cases selected and given VR Distraction during gynecological surgery. Clinically validated relaxation worlds the researchers compared the physiological responses and VR. The results revealed significant lower reports of pain in women receiving VR Distraction co impaired to the non VR group.

## Studies related to Blood Pressure

A study was conducted by Paulo, (2017) about B.P response during resistance training of different work to rest ratio. There were 20 normotensive patients are participated and performed four different resistance training programme of the leg extension exercise but different work to rest ratio structures. Two protocols followed the recommendations for cardiovascular disorders. Systolic and diastolic B.P were assessed by photoplethysmorgraphy. They concluded that resistance training protocols that may mitigate pressure peaks without changing important exercise variables.

Patricia et al (2017) conducted a study about worldwide prevalence of hypertension. A systemic review was conducted with literature searches of the MEDLINE database. The search was restricted to studies published from January 1980 to July 2003. All the data was extracted independently by two investigators using standardized protocol and data collection form. They revealed that measures are required at a population level to prevent the development of hypertension and to improve awareness, treatment and control of hypertension in the community.

Bundy et al (2017) conducted a study about systolic blood pressure reduction and risk of cardiovascular disease and mortality. A systemic review and network meta-analysis was used to obtain pooled randomized results. This study suggested that reducing systolic blood pressure level below currently recommended targets significantly reduces the risk of cardio vascular disease and cause mortality.

Ettehad et al (2016) conducted a study about Blood Pressure lowering for prevention of cardiovascular disease and death. Systemic review and meta-analysis, they searched MEDLINE for large scale blood pressure lowering trials published between 1966 and July, 2017. They identified 123 studies with 613815 participants for the tabular meta-

analysis. They provided strong support for lowering systolic blood pressure less than 130 mm of hg and providing blood pressure lowering treatment to individual with cardiovascular disease.

James et al (2014) conducted a study about evidence based guideline for the management of high Blood Pressure in adults, report from the panel members appointed to the Eight Joint National Committee. The strong evidence to support treating hypertension person aged 60 yrs. There is an insufficient evidence in hypertensive persons younger than 60 yrs for systolic goal. There is a moderate evidence to support initial or add on anti-hypertensive therapy with an angiotensin converting enzyme inhibitor to improve kidney outcomes. They concluded that this guideline provided evidence based recommendation for the management of high B.P and should meet the clinical needs of most patients. These recommendations are not a substitute for clinical judgement. Incorporate the clinical characteristics and circumstances of each individual.

**Development of Nursing Evidence-Based Practice Protocol**

For the development of evidence based practice guideline, an extensive systematic review was carried out by the researcher. The electronic data bases and various hand search strategies were adopted for the systematic review. The search engines included were PubMed Central, Google Scholar, Science Direct, Cochrane Library and ProQuest. All the studies identified through this search were subjected to quality check by using Johns Hopkins evidence Practice Model. The researcher obtained permission from Johns Hopkins University (https://www.ijhn-education.org) to use the Johns Hopkins Nursing Evidence Based Practice (JHN EBP) model and tools. (Annexure k)

The Protocol includes the following aspects in this study:

1. Nursing Evidence Based Practice Question Development
2. PRISMA Flow Diagram
3. Characteristics of included papers (Study design wise and Intervention wise)
4. Individual Evidence Summary

## 1. Nursing Evidence Based Practice Question Development

**What is the problem and why is it important?**

This research focuses on effectiveness of virtual reality therapy upon anxiety and blood pressure among patients undergoing CABG. This research work was undertaken by the investigator to seek evidence as every nurse subjectively have been facing anxiety related problem with the patients undergoing CABG surgery.

**What is the current practice?**

Currently, as India has a higher incidence of CAD and CABG surgeries as compared to other countries in the world. There are some previously published studies on assessment of preoperative anxiety among CABG surgeries from various countries. In 2010, the annual number of CABG surgery in India was about 60000 and in 2012, the number was about 1.5 lakhs (International Journal of Africa Nursing Sciences, volume 7, 2017). The Virtual Reality Therapy plays a vital role to reduce the anxiety and B.P of preoperative CABG patients to reduce the complication and enhance the quality of life.

**What is the focus of the problem?**

The focus of the problem is to reduce the anxiety and blood pressure among patients undergoing CABG by giving virtual reality therapy

**How was the problem identified?**

The problem was identified by the researcher that CABG patients who are undergoing for the surgery experience high level of anxiety. Fear of dying before, rather than during surgery, has been highlighted in an anxious preoccupation. Thus anxiety manifests with autonomic alteration which exacerbate in CAD. After surgery, while anxiety may decrease below comparing pre-operative levels, but still exists and does not go beyond subclinical level.

**What is the scope of the problem?**

In this research work, the problem initially looks at the individual patients undergoing CABG to reduce anxiety and blood pressure with the help of virtual reality therapy to generalize the evidence.

**What are the PICO Components?**

- **P** - Population / Patient. Here, it is patients undergoing CABG.
- **I** – Intervention. Here, it is virtual reality therapy
- **C** – Comparison. Here, a comparison group is also identified who follows regular practices / routines without the given intervention
- **O** – Outcome – The expected outcome is to reduce anxiety and blood pressure among patients undergoing CABG, thus increasing level of satisfaction on the Intervention

## 2. PRISMA Flow Diagram

**PRISMA (Preferred Reporting Items for Systematic Reviews and Meta – Analyses)** is an evidence based minimum set of items aimed at helping authors to report a wide array of systematic reviews and meta-analyses that assess the benefits and harms of a health care

intervention. PRISMA focuses on ways in which authors can ensure a transparent and complete reporting of this type of research.

The two important components of PRISMA are The PRISMA checklist and The PRISMA flow diagram. In this research work, the researcher used the PRISMA flow diagram to depict the flow of information through the different phases of systematic review.

In this research work, PRISMA helped the author mainly focus and improve the reporting of systematic review of randomized controlled trials. It is further used as a basis for reporting reviews of other types of researches like cross sectional, cohort, and case – control studies. Total records collected for the systematic review include 26, out of which 22 were identified through database search and 4 were identified through other searches. Duplicate records were excluded at this stage were 6. The remaining records after undergoing screening for abstract and methodology were 20. Among these 20, 10 were excluded based on the exclusion criteria. The remaining 10 full text articles were assessed for eligibility, out of which 8 full text articles were excluded with reasons. Hence there were 2 studies included for qualitative synthesis / Meta synthesis.

### 3. PRISMA Flow Diagram depicting the different phases of Systematic Review

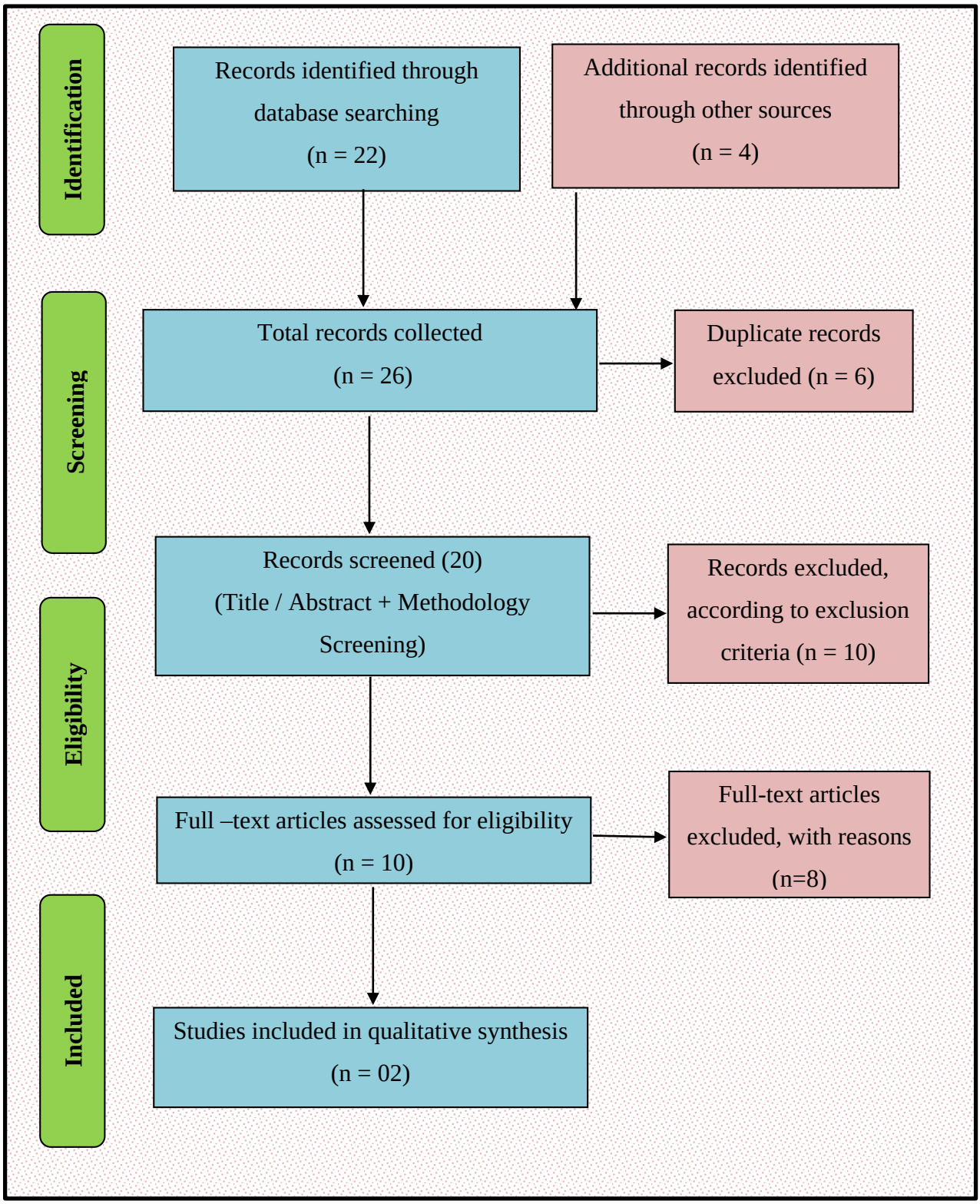


**Fig.2 PRISMA Flow Diagram**

**EBP Question: Is virtual reality therapy as an intervention effective in reducing anxiety and blood pressure among patients undergoing CABG**

**Table1.Individual Evidence Summary of true experimental study based on effectiveness of virtual reality therapy upon anxiety and blood pressure among patients undergoing CABG**

| Article No | Author & Date | Title / Objective | Evidence Type | Sample, Sample Size, Setting and tool used | Study findings that help answer the EBP question | Evidence Level & Quality |
|---|---|---|---|---|---|---|
| 1. | Ramesh et al. (2017) | **Title:** a study about preoperative anxiety in patients undergoing CABG<br><br>**Objective** – the study was to assess preoperative anxiety in patients undergoing CABG surgery. | Cross sectional study | Tertiary care referral hospital, State trait anxiety inventory | The study enrolled 140 (117 males and 23 females) patients. Their mean age was 57.29 (range 35- 70 years). Most of the patients 118(84%) had preoperative anxiety before CABG. There was an association found between gender and anxiety with Pearson chi- square value of 11.57($p<0.001$). | Level II |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2. | Robertson et al (2017) | **Title:** Study on effect of virtual reality therapy in reducing preoperative anxiety in patients prior to the arthroscopic knee surgery.<br>**Objective:**<br>To assess the immerse virtual reality therapy in reducing anxiety of patients in the preoperative arthroscopic knee surgery | A randomized control trial | Sample: patients undergoing arthroscopy<br>Sample size:60 | A total of 60 patients were recruited into the study between September 2015 and February 2016. The mean age of participants was 47 years (range 17- 82) with 22 females and 38 males recruited. A power analysis suggested that recruiting 60 participants would yield 0.80 power to detect a large effect size at a 0.05 alpha level. To ensure the random assignment to intervention groups was effective we examined age and gender allocation. A chi square test also showed no difference in number of males and females assigned to each group. | Level I |

There were 2 evidences on the topic, found appropriate for individual evidence summary and they were tabulated, all of the evidences belonged to level II and level I which is coming under evidence type, randomized controlled trial study.

**Recommendations**

The strength of overall evidence suggests that virtual reality therapy was proven to be effective for reducing anxiety among patients undergoing CABG.

Hence Virtual reality therapy helps in reducing anxiety and blood pressure among patients undergoing CABG. The types of evidences, their level and their findings selected in this study helped the researcher to proceed in the completion of the work.

## Summary

This chapter dealt with review of literature related to the stated research problem which guided the researcher with an evidence to understand the stated problem, develop the tool, data collection and analysis of data. The literatures presented here are extracted from 26 primary sources.

# CHAPTER III

# RESEARCH METHODOLOGY

The methodology in a research study is defined as the way the information is gathered in order to answer the research questions or to analyze the research problem. The research methodology involves a systematic procedure by which the research starts from initial identification of the problem to its conclusion.

The present study was conducted to assess the effectiveness of virtual reality therapy on level of anxiety and B.P among patients undergoing coronary artery bypass grafting in selected hospital, Chennai.

The research methodology includes research design research approach, the setting, population and sample, sampling technique, selection of tool, content validity, reliability, pilot study, data collection procedure and plan for data analysis.

## Research Approach

Research approach is the most significant area of any research. An experimental research is an extremely applied from of research and involves finding out how well a programme, product, practice or policy are working. Its goal is to assess or evaluate the success of the same (Polit and Beck, 2016).

To accomplish the objectives of the study, an experimental approach was used the researcher.

## Research Design

A research design incorporates the most important methodological design that researcher works in conducting a research study (Polit and Beck, 2016). The research design in this study was a True Experimental Research Design.

The research design is represented diagrammatically as follows.

**R O1 - O2**

**R O1 X O2**

**R-** Randomization of patients.

**O1-** Pretest of anxiety and B.P among patients undergoing CABG.

**X-** Virtual Reality Therapy. It was provided for 4 consecutive days (2 days before and 2 days after CABG surgery except on the day of surgery) for 15 minutes twice a day.

**O2–**Posttest level of Anxiety and B.P

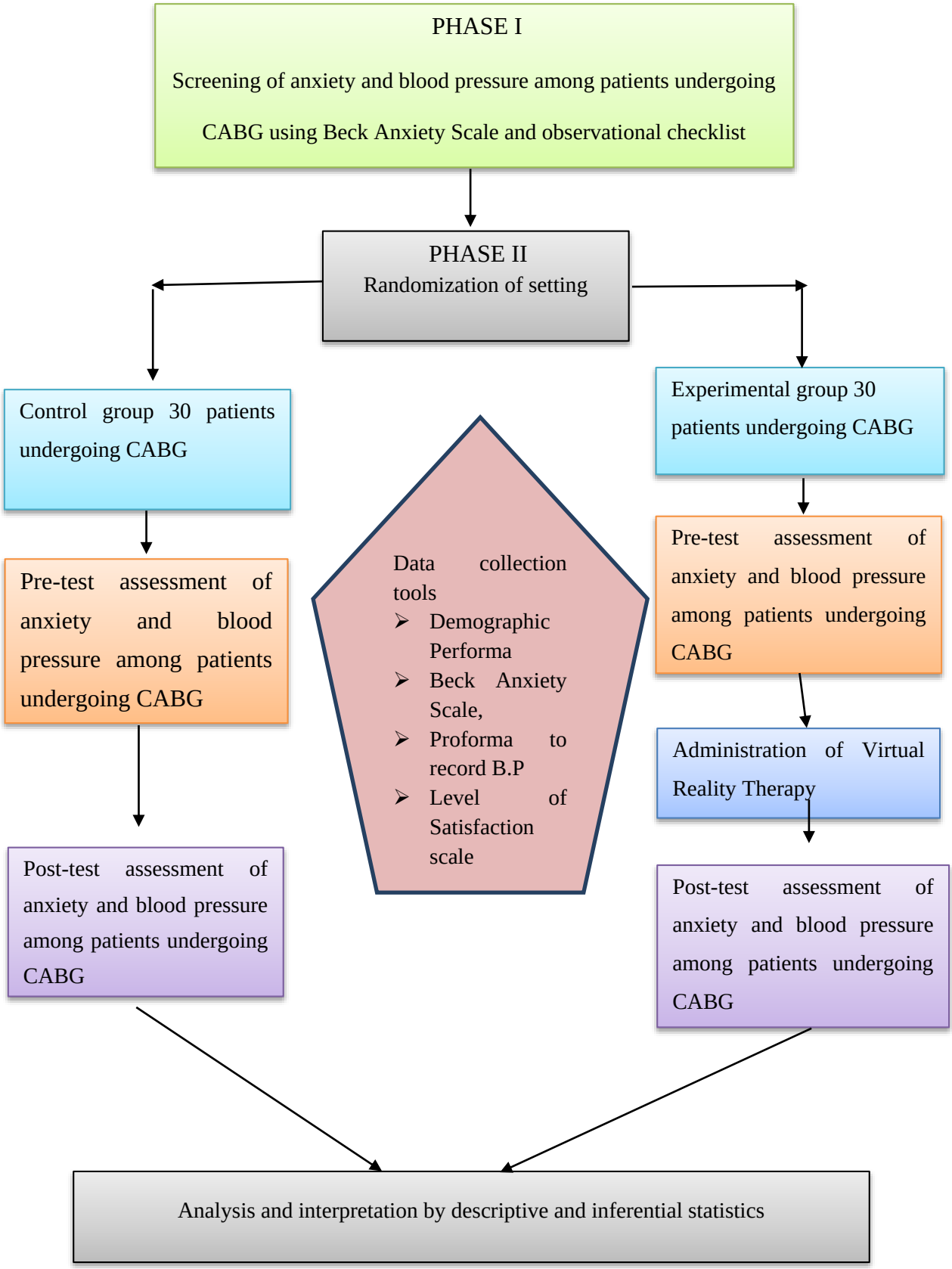


**Fig 3: Schematic Presentation of Research Design**

## Variables

A variable is an attribute that varies on different values when taken (Polit and Beck, 2016).

### Independent Variable

It is the variable hypothesized to the outcome variable of interest.

In this study the independent variable is Virtual Reality Therapy.

### Dependent Variable

It is the variable hypothesized to depend on or to be caused by another variable.

In this study dependent variables were anxiety and B.P of patients undergoing coronary artery bypass grafting surgery.

### Attribute variables

### Demographic Variables

Demographic variables consisted of age, gender, educational status, occupational status, family income of patients undergoing CABG.

### Clinical Variables

This is to assess the clinical variables such a height and weight, body mass index, duration of present illness, history of hypertension, history of taking antihypertensive drugs, no of days in hospitalization, nature of physical activity, history of comorbid illness dietary history, history of smoking and history of alcoholism.

### Research Setting

A setting is the physical location and condition in which data collection tales place in the study (Polit and Beck, 2016).

The study was conducted in Apollo Hospital, Chennai. Its JCIA accredited hospital.

Apollo Main hospital, Chennai is a multi-specialty hospital with 700 beds which is 27km away from Apollo College of Nursing, Ayanambakkam. It has over 60 departments, spearheaded by internationally trained and skillful medical experts who are supported by dedicated patient care personal and they perform around 5 CABG cases every day. The patient's average length of stay in hospital is 2 days in ward before CABG and 3 days in ICU after CABG, which is continued for 2 days in ward.

## Population

Population is the entire aggregation of cases which meet designated criteria.

### Target Population

Target population is the group that the researcher aims to study and to whom study findings will be generalized.

In this study, the target population comprises all those patients who were undergoing CABG surgery.

### Accessible Population

It is the number of patients who are undergoing CABG that the researcher finds in the study area.

In this study, the accessible population was the CABG patients who meets the inclusion criteria.

## Sample

Sample consists of subset of units that comprise the population (Polit and Beck, 2016).

In this study, samples were the patients undergoing CABG who meets the inclusion criteria was chosen for the study.

**Sample Size**

A sample size of 60patients undergoing CABG was chosen for the study in selected hospital, Chennai (30 patients in control group and 30 patients in experimental group).

**Sampling Technique**

The process of selecting a portion of population to represent the entire population (Polit and Beck, 2016). Sampling technique is chosen based on the availability of samples.

Systematic Simple Random Sampling Technique was used to select the samples from the selected hospital. List on patients undergoing CABG on the particular day was collected from the hospital. Required number of samples (4-5 patients) of samples were selected by systematic simple random sampling technique.

Among the selected samples on each day, 2 were assigned for control group and 2 were assigned for experimental group systematically based on odd and even number method.

**Sampling criteria**

**Inclusion Criteria**

- Patients aged between 40- 70 years
- Pre-operative CABG patients
- Patients who are physically mobile

**Exclusion Criteria**

- Not willing to participate in the study
- People who have visual and hearing problems
- GCS < 15

- Who do not have smart phone
- Patients who are very sick and unable to cooperate for the study

### Selection and development of study instruments

The present study was based on evaluating the effectiveness of virtual reality therapy upon anxiety and B.P among patients undergoing CABG at selected hospital, Chennai. So, the data collection tools were developed through an extensive review of literature in consultation with the research experts and faculty. The instruments to be used in the study are-

- **Demographic Variables Proforma**
- **Clinical Variables Proforma**
- **Proforma to Record B.P and sphygmomanometer to measure B.P**
- **Beck Anxiety Inventory**
- **Rating scale for Level of Acceptability on Virtual Reality Therapy**
- **Intervention Protocol**

### Demographic Variables Proforma

The demographic variables Proforma consisted of age, gender, educational status, occupational status and family income of patients undergoing CABG

### Clinical Variables Proforma

The clinical variable Proforma consisted of height, weight, body mass index, duration of present illness, history of hypertension, history of taking anti-hypertensive drugs, no of days in hospitalization, nature of physical activity, history of comorbid illness, dietary history, history of smoking and history of alcoholism.

## Proforma to Record B.P

The Proforma developed by the researcher to record systolic B.P and diastolic B.P in pretest and posttest. Sphygmomanometer is a device used to measure blood pressure, composed of an inflatable cuff to collapse and release artery under in a controlled manner. Manual sphygmomanometer is used in conjunction with stethoscope

The B.P values were classified based on **American Heart Association Recommendation**

| **B.P Category** | **Systolic B. P** | **Diastolic B.P** |
|---|---|---|
| | **mm of hg** | **mm of hg** |
| Normal | less than 120 | less than 80 |
| Prehypertension | 120-139 | 80-89 |
| Hypertension | 140 and above | 90 and above |

## Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI) is a standardized well-accepted and widely used self-report measure of anxiety in adults and adolescents for use in both clinical and research settings. The Beck anxiety inventory (BAI), developed by Aaron T. beck, MD, and colleagues, is a 22 items, 4 points rating scale that measures the severity of an anxiety in adults and adolescents

### Administration, scoring, and interpretation of Beck Anxiety Inventory

Each symptom item has four answer choices: Not at all; mildly (it did not bother me much), moderately (it was very unpleasant, but I could stand it) and; severely (I could barely stand it. The researcher assigns the following values to each response: not at all =0; mildly =1, moderately =2, and; severely=3. The obtainable scores using this scale is 0 to 69. Respondents are asked to report the extent to which they have been bothered by each of the 22 symptoms the week preceding (including of the day) their completion of Beck

anxiety index. The total score is obtained by totaling the individual item scores. The obtained scores are interpreted as follows.

| **Score** | **Interpretation** |
|---|---|
| 0-21 | Low anxiety |
| 22- 35 | Moderate anxiety |
| 36 and above | Potentially concerning levels of activity |

**Rating scale to assess the Level of acceptability on virtual reality therapy.**

This is developed by the investigator to assess the acceptability of virtual reality therapy among patients undergoing CABG at Apollo hospitals Chennai. This scale is consisted of 12 items of acceptability of study participants regarding the various aspects of virtual reality therapy ad rated on 4-point scale with the score highly acceptable-4, acceptable-3, unacceptable-2 highly unacceptable-1. The total obtainable score is 10 – 40.

The obtained score is converted into percentage and interpreted as follows

| **Percentage** | **Acceptability** |
|---|---|
| 76-100% | Highly acceptable |
| 51- 75% | Acceptable |
| 25-50% | Unacceptable |
| Below 25% | Highly unacceptable |

## Psychometric Properties of Instruments

### Validity

The content validity is the degree to which an instrument measures what it is supposed to measure. Content validity is the sampling adequacy of the content being measured (Polit and Beck, 2016)

The Beck Anxiety Scale is a valid and reliable tool developed by Dr. Aaron T Beck and permission has been granted by the author to use the tool as part of the research.

### Reliability

Reliability is the degree of consistency or dependability with which an instrument measures the attribute it intended for measurement (Polit and Beck, 2016). The reliability of the tools was determined by using inter rater technique. Karl Pearson's 'r' was computed for finding out the reliability.

Test- retest reliability (1 week) for the BAI (r=0.75).

Proforma for recording blood pressure- inter rater technique (r = 0.90).

## Intervention Protocol

Virtual reality therapy is a technique that allows person to participate actively in a sense of being present in the virtual environment. Virtual reality is invented by Morton H Eilig in 1956. Prof. V.S. Ramachandran from the University of California is noted for his use of virtual reality and neuro imaging- mirror neurons. Virtual reality has been proposed as a new way of conducting exposure therapy because it can provide a sense of being in a feared situation.

The virtual reality therapy is an artificial environment created by software and projected by capturing the user by sensor. The user will be projected in the screen as a

disease free user. The person suspends the belief of presence of disease and accepts the real environment. When the brain is preoccupied with virtual environment, it does not perceive other stimuli as effective as it otherwise good. The mechanism in turn, greatly lessens the sensation of real disease of the patients.

Virtual Reality MEDITATION is a relaxation therapy where the patient experienced flurry of new gadgets are set to change the way to meditate. It was composed of walking in beach, boating and natural sceneries. There was enjoyable music's and enjoyable mystic dark nebula, it was provided with 'Cardboard glasses' to watch the game and mind was relaxed. More specifically designed environments with user friendly atmosphere can be created which allow for border virtual reality usage in treatment and research.

The patient was made to sit on the bed and asked to wear Cardboard glasses and then VR meditation sceneries were played through mobile application. They were followed the scenes one by one where the natural sceneries and boating were displayed. The music's and the solar system gives audio effect to get more interest towards the relaxation. During preoperative period, virtual reality therapy was given in the morning at 8 am and evening at 4pm before taking routine medications consecutively for 2 days. It was continued in their postoperative period for 2 days till they were shifted to ward.

## Pilot Study

According to (Polit and Beck 2016), a pilot study is a miniature or some part of the actual study, in which the instruments are administered to the subjects drawn from the population. It is a small scale version or trial run, done in the preparation for the major study. The purpose is to find out the feasibility and practicability of the study design.

A pilot study was conducted in Apollo Main Hospital, Nungambakkam among 10 patients undergoing CABG. The data collection carried out for a period of 1 weeks from January 22th, 2018 to January 28, 2018. The patients were randomized using systematic Simple Random Technique on the basis of selection criteria. The purpose and duration of the study was explained to the samples to obtain their cooperation and informed consent was taken from participants. Pretest was done by using beck anxiety scale and Proforma for recording B.P from both group.

The patient was made to sit on the bed and wear the Cardboard glasses and VR meditation sceneries were played through mobile application. They were followed the scenes one by one where the natural sceneries and boating were displayed. During preoperative period, virtual reality therapy was given in the morning at 8 am and evening at 4 pm before taking routine medications consecutively for 2 days. It was continued in their postoperative period for 2 days till they were shifted to ward. No intervention was provided to the control group. Posttest was done on $5^{th}$ POD by neck anxiety scale and Proforma to record B.P from both groups. Level of acceptability was obtained from experimental group of patients undergoing CABG. Study was found to be feasible and no modifications were required in tools or design.

**Protection of Human Rights**

- Permission was obtained from Principal and H.O.D of Medical surgical nursing, Apollo College of Nursing, Medical Director, Apollo Hospitals, Chennai.
- Approval for study was obtained from the ethics committee in the Apollo hospitals, Chennai.
- Informed consent was obtained from the study participants.
- Confidentiality was maintained throughout the study.

- Precaution was taken to protect the patients from any physical and psychological harm.
- Debriefing was done after each session of therapy.

**Data Collection Procedure**

The data collection is the gathering of information about something which the researcher has chosen to explore or investigate (Polit and Beck, 2016).

The researcher was trained one week in giving virtual reality therapy and certified before data collection. The study was conducted in the Apollo hospital, Chennai (control and experimental group).

The data collection was done for a period of 6weeks. First rapport was established by a brief introduction about the research purpose. After the initial introduction by researcher, informed consent was obtained from the study participants. An assurance was given regarding confidentiality before the data collection procedure.

Data was collected through the self-administration method by using instruments (Demographic variable Performa, Beck Anxiety Inventory, Proforma to record B.P and level of acceptability scale).

The study was conducted in Apollo Main Hospital, Nungambakkam from January 28$^{th}$ 2018 to April 5, 2018. The patients were randomized using systematic Simple Random Technique on the basis of selection criteria. The purpose and duration of the study was explained to the samples to obtain their cooperation and informed consent was taken from participants. Pretest was done by using beck anxiety scale and Proforma for recording B.P from both group.

The patient was made to sit on the bed and wear the cardboard glasses and VR meditation sceneries were played through mobile application. They were followed the scenes one by one where the natural sceneries and boating were displayed. The music's and the solar system gives audio effect to get more interest towards the relaxation. During preoperative period, virtual reality therapy was given in the morning at 8 am and evening at 4 pm before taking routine medications consecutively for 2 days. It was continued in their postoperative period for 2 days till they were shifted to ward. No intervention was provided to the control group. Posttest was done on $5^{th}$ POD by using Beck anxiety scale and Proforma for recording B.P from both groups respectively. Level of acceptability was obtained from experimental group of patients undergoing CABG.

## Plan for data analysis

Data analysis is the systematic organization, synthesis of research data and testing of null hypothesis by using the obtained data (Polit and Beck, 2016). Data was analyzed and interpreted by using descriptive & inferential statistics.

**Table 2: Plan for Data Analysis**

| Statistics | Test | Purpose |
|---|---|---|
| Descriptive | Frequency (f) and percentage (%) | ➢ To describe the demographic variables, Clinical variables and Level of satisfaction |
| | Mean (M) and (SD) | ➢ To describe anxiety score and blood pressure |
| Inferential | Paired 't' test<br><br>Independent 't" test | ➢ To find out the difference between pretest and posttest in control and experimental group<br>➢ To find out the difference between control and experimental group in pretest and posttest |
| | Correlation (r) | ➢ To find out the correlation between anxiety scores and blood pressure |
| | Association ( $\chi^2$) | ➢ Association between<br>1. Demographic variables and anxiety<br>2. Clinical variables and anxiety<br>3. Demographic variable sand blood pressure<br>4. Clinical variables and blood pressure |

## Summary

This chapter has dealt with the selection of research approach, research design, setting, population, sample, sampling technique, sampling criteria, selection and development of study instruments, validity and reliability of the study instrument, pilot study, data collection procedure and plan for data analysis. The following chapter deals with analysis and interpretation data using descriptive and inferential statistics.

# CHAPTER IV

# ANALYSIS AND INTERPRETATION

The analysis is defined as the method of organizing data in such a way that the research question can be answered. Interpretation is the process of the results and of examining the simplification of findings with a broader context (Polit and Beck, 2016).

This chapter deals with analysis and interpretation including both descriptive and inferential statistics. Statistics is a field of study concerned with techniques or methods of collection of data, classification, summarizing, and interpretation, drawing inference, testing of hypothesis and making recommendations (Mahajan, 2004).

The data was analyzed according to the objectives and hypothesis of the study. Analysis of the study was compiled posttest all the data was transferred to the master coding sheet. The investigator used descriptive and inferential statistics for analysis. The data were analyzed, tabulated and interpreted using appropriate descriptive and inferential statistics.

## Organization of the Findings

The findings of the study were organized and presented under the following headings

- Frequency and percentage distribution of demographic variables in control and experimental group of patients undergoing CABG
- Frequency and percentage distribution of clinical variables in control and experimental group of patients undergoing CABG
- Frequency and percentage distribution of anxiety scores of pretest and posttest in control and experimental group of patients undergoing CABG
- Frequency and percentage distribution of B.P scores between pretest and posttest in control and experimental group of patients undergoing CABG

- Comparison of Mean and Standard Deviation of pretest and posttest Anxiety Scores in Control and Experimental Group of Patients Undergoing CABG
- Comparison of mean and standard deviation of anxiety scores between pretest and posttest in control and experimental group of patients undergoing CABG
- Comparison of mean and standard deviation of B.P scores between pretest and posttest in control and experimental group of patients undergoing CABG
- Frequency and percentage distribution of level of acceptability regarding virtual reality therapy among experimental group of patients undergoing CABG
- Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in pretest
- Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in posttest
- Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in pretest
- Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in posttest
- Association between selected demographic variables and the level of anxiety in pretest and posttest in control group of patients undergoing CABG
- Association between selected demographic variables and the level of anxiety in pretest and posttest in experimental group of patients undergoing CABG
- Association between selected clinical variables and the level of anxiety in pretest and posttest in control group of patients undergoing CABG
- Association between selected clinical variables and level of anxiety in pretest and posttest in experimental group of patients undergoing CABG

- Association between selected demographic variables and level of systolic B.P and diastolic B.P in pretest and posttest in control group of patients undergoing CABG
- Association between selected demographic variables and level of systolic B.P and diastolic B.P in pretest and posttest in experimental group of patients undergoing CABG
- Association between selected clinical variables and level of systolic B.P and diastolic B.P in pretest and posttest in control group of patients undergoing CABG
- Association between selected clinical variables and level of systolic B.P and diastolic B.P in pretest and posttest in experimental group of patients undergoing CABG

**Table 3. Frequency and Percentage Distribution of Demographic Variables in Control and Experimental Group of Patients undergoing CABG**

| Demographic variables | Control group (n=30) | | Experimental group(n=30) | | $\chi^2$ p>0.05 |
|---|---|---|---|---|---|
| | f | % | f | % | |
| **Age** | | | | | |
| 41 yrs to 50 yrs | 8 | 26.66 | 6 | 20 | 3.6 |
| 51 yrs to 60 yrs | 15 | 50 | 10 | 33.33 | df=2 |
| 61yrs to 70 yrs | 7 | 23.33 | 14 | 46.67 | |
| **Gender** | | | | | |
| Male | 28 | 93.33 | 24 | 80 | 0.3# |
| Female | 2 | 6.67 | 6 | 20 | df=1 |
| **Educational status** | | | | | |
| Primary education | 3 | 10 | 3 | 10 | |
| Secondary education | 11 | 36.67 | 10 | 33.33 | 0.92 |
| Higher secondary | 10 | 33.33 | 11 | 36.67 | df=3 |
| Graduate | 6 | 20 | 6 | 20 | |
| illiterate | 0 | 0 | 0 | 0 | |
| **Monthly income** | | | | | |
| Upto Rs.40000/ month | 7 | 23.33 | 10 | 33.33 | 0.72 |
| Above Rs.40000/ month | 23 | 76.67 | 20 | 66.67 | df=1 |

Table 3 reveals that, majority of the patients were males (93.33%, 80%) and their income was above 40000/ month (76.67%, 66.67%) in control and experimental group respectively. With regard to other variables, they were aged between 61yrs to 71 yrs (23.33%, 46.67%), had higher secondary education (33.33%, 36.67%) and involved in business (33.33%, 40%) in control and experimental group respectively.

**Fig 4:** with regard to occupational status of patients undergoing CABG, (23%, 10%) have government job, (30%, 23.33%) have private job and (33.33%, 40%) did business in control and experimental group respectively.

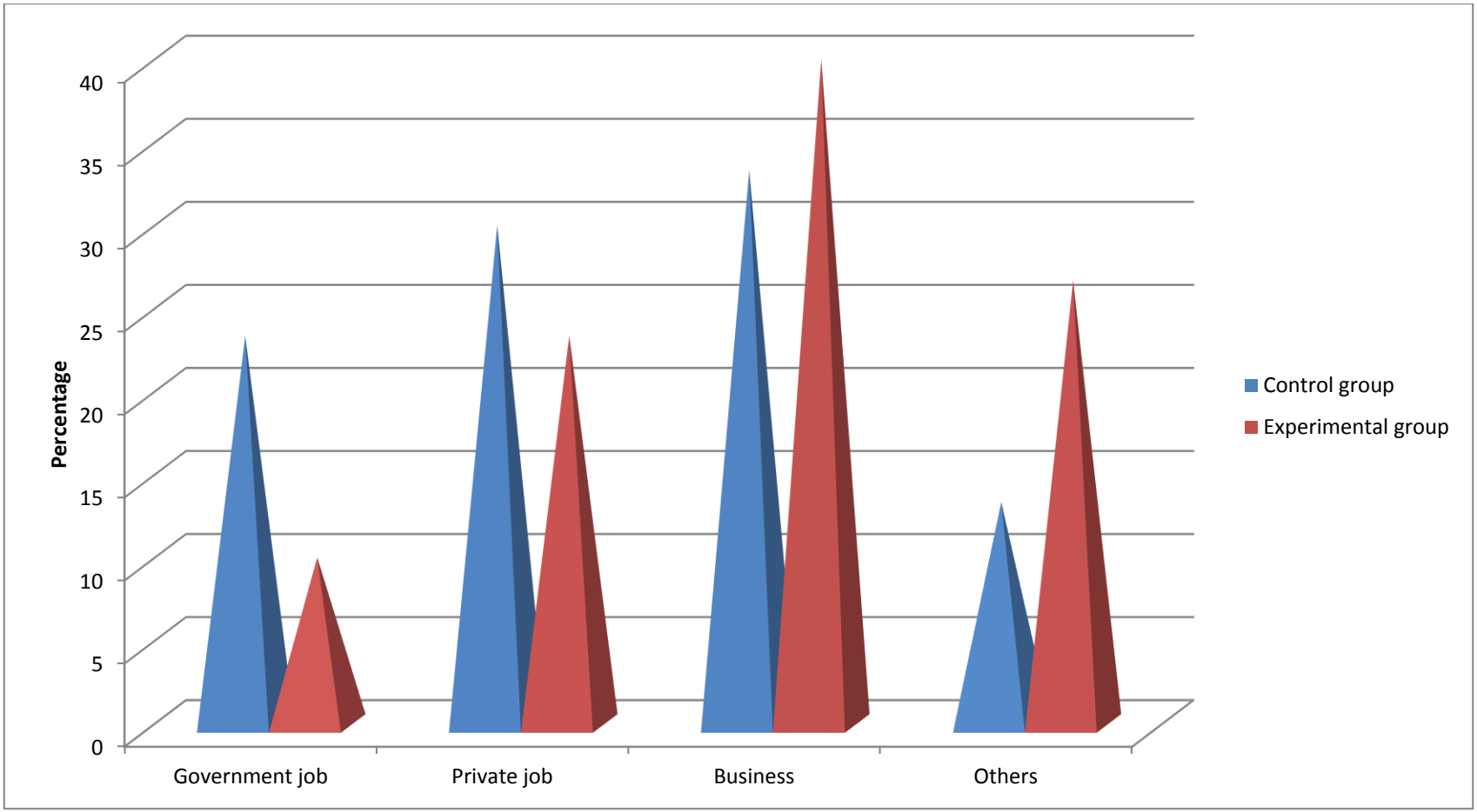


**Fig 4: Frequency Distribution of Occupational Status of Patients undergoing CABG**

**Table 4**

**Frequency and Percentage Distribution of Clinical Variables in Control and Experimental Group of Patients Undergoing CABG**

| Clinical variables | Control group(n =30) | | Experimental group(n=30) | | $\chi^2$ |
|---|---|---|---|---|---|
| | f | % | f | % | |
| **Body mass index** | | | | | |
| <25 | 15 | 50 | 8 | 26.67 | |
| 25-29 | 13 | 43.33 | 17 | 56.67 | 3.92 |
| 30-34 | 2 | 6.67 | 5 | 16.67 | df=2 |
| 35-39 | 0 | 0 | 0 | 0 | |
| **Duration of present illness** | | | | | |
| < 5 yrs | 30 | 100 | 27 | 90 | |
| 5 – 10 yrs | 0 | 0 | 3 | 10 | |
| More than 10 yrs | 0 | 0 | 0 | 0 | - |
| **History of hypertension** | | | | | |
| No | 14 | 46.67 | 14 | 46.67 | |
| Yes | 16 | 53.33 | 16 | 53.33 | 0.00 |
| **History of taking anti-hypertensive drugs** | | | | | |
| No | 14 | 46.67 | 17 | 56.67 | |
| Regular | 16 | 53.33 | 10 | 33.33 | - |
| Occasional | 0 | 0 | 3 | 10 | |
| **No of days in hospitalization** | | | | | |
| <5 yrs | 27 | 90 | 28 | 93.33 | - 0.018# |

| | | | | | |
|---|---|---|---|---|---|
| 5 – 10 yrs | 3 | 10 | 2 | 6.67 | df=1 |
| More than 10 yrs | 0 | 0 | 0 | 0 | |
| **Nature of physical activity** | | | | | |
| Secondary | 10 | 33.33 | 16 | 53.33 | |
| Moderate | 14 | 46.67 | 14 | 46.67 | - |
| Heavy | 6 | 20 | 0 | 0 | |
| **History of comorbid illness** | | | | | |
| No | 26 | 86.67 | 24 | 80 | -1.52[#] |
| Yes (mention year) | 4 | 13.33 | 6 | 20 | df=1 |
| **Dietary history** | | | | | |
| Vegetarian | 20 | 66.67 | 16 | 53.33 | 1.1 |
| Non vegetarian | 10 | 33.33 | 14 | 46.67 | df=1 |
| **History of smoking** | | | | | |
| No | 28 | 93.33 | 23 | 76.67 | |
| Occasional | 2 | 6.67 | 5 | 16.67 | - |
| Yes (mention year) | 0 | 0 | 2 | 6.67 | |
| **History of alcoholism** | | | | | |
| No | 26 | 86.66 | 24 | 80 | |
| Occasional | 4 | 13.33 | 6 | 20 | - |
| Yes (mention year) | 0 | 0 | 0 | 0 | |

# Yates corrected values

Table 4 reveals that, majority of patients had illness for less than 5 years (100%, 90%), no history of smoking (93.33%, 76.67%), had no history of alcoholism (86.66%, 80%), hospitalized for 5- 10 days (90%, 93.33%) in control and experimental group respectively.

Around half of them, had hypertension (53.33%, 53.33%), not taking antihypertensive drugs (46.47%, 56.67%), body mass index was between 25- 29 (43.33%, 56.67%) and involved in moderate physical activity (46.47%, 46.67%), were vegetarian (66.67%, 53.33%) in control and experimental group respectively.

With regard to other variables, their BMI was less than 25 (50%, 26.67%), and non-vegetarian (33.33%, 46.67%).

**Table 5**

**Frequency and Percentage Distribution of pretest and posttest Anxiety scores in Control and Experimental Group of Patients Undergoing CABG**

| Groups | Pre test | | | | | | Post test | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mild | | Moderate | | Severe | | Mild | | Moderate | | Severe | |
| | f | % | f | % | f | % | f | % | f | % | f | % |
| Control group (n= 30) | 26 | 86.66 | 4 | 13.33 | 0 | 0 | 27 | 90 | 3 | 10 | 0 | 0 |
| Experimental group(n = 30) | 26 | 86.67 | 4 | 13.33 | 0 | 0 | 29 | 96.67 | 1 | 3.33 | 0 | 0 |

Table 5 shows that Majority of patients had mild level of anxiety in control (86.66%, 90%) and experimental group (86.67%, 96.66%) in pretest and posttest.

**Table 6**

**Frequency and Percentage Distribution of B.P scores in Pretest and Posttest in Control and Experimental Group of Patients Undergoing CABG**

| BP Scores | Control group (n = 30) | | | | Experimental group (n=30) | | | |
|---|---|---|---|---|---|---|---|---|
| | Pre test | | Post test | | Pretest therapy | | Post test | |
| | f | % | f | % | f | % | f | % |
| **Systolic B.P** | | | | | | | | |
| Normal | 12 | 40 | 12 | 40 | 9 | 30 | 9 | 30 |
| Pre hypertension | 13 | 43.33 | 12 | 40 | 14 | 46.66 | 15 | 50 |
| High B.P | 5 | 16.66 | 6 | 20 | 7 | 23.33 | 6 | 20 |
| **Diastolic B.P** | | | | | | | | |
| Normal | 13 | 43.33 | 13 | 43.33 | 25 | 83.33 | 25 | 83.33 |
| Prehypertension | 13 | 43.33 | 12 | 43.33 | 5 | 16.66 | 5 | 16.66 |
| High B.P | 4 | 13.33 | 5 | 16.66 | 0 | 0 | 0 | 0 |

Table 6 shows that, Majority of patients had normal diastolic B.P (83.33%, 83.33%) and had prehypertension in systolic B.P (46.67%, 50%) in experimental group in pretest and posttest. However, less than half of patients had prehypertension in systolic B.P (43.33%, 40%), had prehypertension in diastolic B.P (43.33%, 43.33%) in control group in pretest and posttest.

With regard to other variables, they had normal systolic B.P in experimental group in pretest and posttest (30%, 30%).

**Table 7**

**Comparison of Mean and Standard Deviation of pretest and posttest Anxiety Scores in Control and Experimental Group of Patients Undergoing CABG**

| Groups | Pretest | | | Post-test | | |
|---|---|---|---|---|---|---|
| | **Mean** | **SD** | **Independent t value** | **Mean** | **SD** | **Independent t value** |
| **Control Group (n=30)** | 19.7 | 2.70 | 0.33 | 19.17 | 2.33 | 5.77*** |
| **Experimental Group (n=30)** | 17.37 | 3.99 | | 14.83 | 3.29 | |

***p<0.001

Table 7 depicts that, there was no significant difference in the mean anxiety score and standard deviation of control group of patients between pretest (19.7 $\pm$ 2.70) and posttest (19.17$\pm$2.33) at (p> 0.05). Whereas in experimental group, there was significant difference in the mean anxiety score and standard deviation between pretest (19.7 $\pm$ 2.70) and posttest (19.17$\pm$2.33) at (p< 0.001). Anxiety scores were less in posttest than pretest in experimental group. It can be attributed to the effectiveness of virtual reality therapy on reducing anxiety.

**Table 8**

**Comparison of Mean and Standard Deviation of Anxiety Scores Between pretest and posttest in Control and Experimental Group of Patients Undergoing CABG**

| Anxiety scores | Control group (n=30) | | Paired 't' test | Experimental Group (n=30) | | Paired 't' test |
|---|---|---|---|---|---|---|
| | Mean | Standard Deviation | | Mean | Standard Deviation | |
| **Pretest** | 19.7 | 2.7 | 0.0002 | 17.37 | 3.99 | 5.59*** |
| **Posttest** | 19.17 | 2.33 | | 14.83 | 3.29 | |

***p<0.001

The findings from the above table indicates that the mean and the standard deviation of pre-test and post-test anxiety scores of control group of patients (M= 19.7& SD= 2.7, M= 19.17& SD= 2.33) is higher than the experimental group (M= 17.37 & SD= 3.99, M= 14.83 & SD= 3.29) which is statistically significant with a 't' value of 5.59 at p<0.001. This can be attributed to the effectiveness of virtual reality therapy upon anxiety. Hence the null hypothesis **(Ho1)** "There will be no significant difference between pre-test and post-test anxiety scores in control and experimental group of patients undergoing CABG" was rejected.

**Table 9**

**Comparison of Mean and Standard Deviation of B.P scores between Pretest and Posttest in Control and Experimental Group of Patients Undergoing CABG**

| B.P scores | Control group (n=30) | | Paired t test value | Experimental Group (n=30) | | paired t test value |
|---|---|---|---|---|---|---|
| | Mean | Standard Deviation | | Mean | Standard Deviation | |
| **Systolic B.P** | | | | | | |
| Pretest VRT | 121.3 | 12.95 | 1.79 | 123.66 | 12.63 | 1.00 |
| Posttest VRT | 121.33 | 13.32 | | 122.66 | 12.26 | |
| **Diastolic B.P** | | | | | | |
| Pretest VRT | 76 | 8.55 | 0.99 | 65.66 | 8.20 | 1.00 |
| Posttest VRT | 76.3 | 8.89 | | 65.33 | 8.40 | |

Table 9 shows that, Mean and standard deviation of systolic B.P in control group did not show any significant reduction in posttest (M121.33, SD 13.32), when compared with pretest (M121.3, SD 12.95). In experimental group also mean and standard deviation of systolic B.P did not show any significant reduction in posttest (M 122.66, SD 12.26), when compared with pretest (M 123.66, SD 12.63).

Mean and standard deviation of diastolic B.P in control group did not show any significant reduction in posttest (M 76.3, SD 8.89), when compared with pretest (M 76, SD 8.55). In experimental group also mean and standard deviation of diastolic B.P did not show any significant reduction in posttest (M 65.33, SD 8.40), when compared with pretest (M 65.66, SD 8.20). Hence the null hypothesis **(Ho2)** "There will be no significant difference between pretest and posttest B.P scores in control and experimental group of patients undergoing CABG" was retained.

**Table 10**

**Frequency and Percentage Distribution of Level of Acceptability Regarding Virtual Reality Therapy among Experimental Group of Patients Undergoing CABG**

**(N=30)**

| Level of acceptability | Highly accepted | | Accepted | | Unaccepted | | Highly Unaccepted | |
|---|---|---|---|---|---|---|---|---|
| | f | % | f | % | f | % | f | % |
| Overall Satisfaction Related to therapy | 30 | 100 | - | | - | | - | |
| Outcome of Virtual Reality therapy | 30 | 100 | - | | - | | - | |
| Therapy | 30 | 100 | - | | - | | - | |
| Related to Researcher | 30 | 100 | - | | - | | - | |

Table 10 shows that all the patients in experimental group have highly accepted the virtual reality therapy provided by the researcher (100%).

**Table 11**

**Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in pretest**

**(N=30)**

| Variables | r value and P value | Anxiety | Systolic B.P | Diastolic B.P |
|---|---|---|---|---|
| Anxiety | r value | 1 | | |
| | P value | | | |
| Systolic B.P | r value | 0.041 | 1 | |
| | P value | 0.829 | | |
| Diastolic B.P | r value | -0.083 | 0.266 | 1 |
| | P value | 0.664 | 0.156 | |

Table 11 shows that there was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in pretest ($p>0.05$). Hence the null hypothesis **(Ho3)** "There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG" was retained.

**Table 12**

**Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in posttest**

**(N=30)**

| Variables | r value and P value | Anxiety | Systolic B.P | Diastolic B.P |
|---|---|---|---|---|
| Anxiety | r value | 1 | | |
| | P value | | | |
| Systolic B.P | r value | -0.84 | 1 | |
| | P value | 0.660 | | |
| Diastolic B.P | r value | -0.185 | 0.219 | 1 |
| | P value | 0.328 | 0.244 | |

Table 12 shows that there was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in posttest ($p>0.05$). Hence the null hypothesis **(Ho3)** "There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG" was retained.

**Table 13**

**Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in pretest**

**(N=30)**

| Variables | r value and P value | Anxiety | Systolic B.P | Diastolic B.P |
|---|---|---|---|---|
| Anxiety | r value | 1 | | |
| | P value | | | |
| Systolic B.P | r value | 0.041 | 1 | |
| | P value | 0.829 | | |
| Diastolic B.P | r value | -0.083 | 0.266 | 1 |
| | P value | 0.664 | 0.156 | |

Table 13 shows that there was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in pretest ($p>0.05$). ). Hence the null hypothesis **(Ho3)** "There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG" was retained.

**Table 14**

**Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in posttest**

**(N=30)**

| Variables | r value and P value | Anxiety | Systolic B.P | Diastolic B.P |
|---|---|---|---|---|
| Anxiety | r value | 1 | | |
| | P value | | | |
| Systolic B.P | r value | -0.094 | 1 | |
| | P value | 0.621 | | |
| Diastolic B.P | r value | -0.185 | 0.219 | 1 |
| | P value | 0.328 | 0.244 | |

Table 14 shows that there was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in posttest ($p>0.05$). Hence the null hypothesis **(Ho3)** "There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG" was retained.

**Table 15**

**Association between Selected Demographic Variables and the level of Anxiety in Pretest and Posttest in Control and Experimental Group of Patients Undergoing CABG**

**(N=30)**

| Demographic Variables | Pre test | | | Post test | | |
|---|---|---|---|---|---|---|
| | Above Mean | Upto Mean | $\chi^2$ p>0.05 | Above Mean | Upto Mean | $\chi^2$ p>0.05 |
| **Age ( in years )** | | | | | | |
| 41- 60 yrs | 9 | 14 | - | 9 | 14 | - |
| 61- 70 yrs | 4 | 3 | | 4 | 3 | |
| **Educational Status** | | | | | | |
| Till Secondary | 4 | 10 | 1.21# | 3 | 11 | -0.14# |
| Higher Secondary | 9 | 7 | df=1 | 7 | 9 | df=1 |
| **Occupational status** | | | | | | |
| Government and Private job | 6 | 10 | 0.015 df=1 | 4 | 12 | -0.97 # df=1 |
| Business and others | 7 | 7 | | 6 | 8 | |
| **Income** | | | | | | |
| Upto Rs.40000 | 1 | 6 | - | 1 | 6 | - |
| Above Rs.40000 | 12 | 11 | | 12 | 11 | |

# Yates corrected values

Note: The demographic variables were merged together for the computation of chi square analysis.

It can be inferred from table 15 that there was no significant association between selected demographic variables of control group and level of anxiety in pretest and posttest ($p>0.05$). Hence, the null hypothesis **(Ho4)** "There will be no significant association between the selected demographic variables and level of Anxiety in pretest and posttest of patients undergoing CABG" was retained.

**Table 16 Association between Selected Demographic Variables and Level of Anxiety in Pretest and Posttest in Experimental Group of Patients Undergoing CABG**

**(N=30)**

| Demographic Variables | Pre test | | $\chi^2$ p>0.05 | Post test | | $\chi^2$ p>0.05 |
|---|---|---|---|---|---|---|
| | Above mean | Upto mean | | Above mean | Upto mean | |
| **Age (in years)** | | | | | | |
| 41 yrs- 60 yrs | 9 | 7 | 0.005 | 13 | 3 | -1.82# |
| 61 yrs- 70 yrs | 3 | 11 | | 11 | 3 | |
| **Educational status** | | | | | | |
| Till Secondary | 5 | 8 | 0.0007 | 11 | 2 | -1.69# |
| Higher Secondary | 7 | 10 | | 13 | 4 | |
| **Occupational status** | | | | | | |
| Government and Private job | 4 | 6 | 0 | 8 | 2 | 0 |
| Business and others | 8 | 12 | | 16 | 4 | |
| **Income** | | | | | | |
| UptoRs.40000 | 4 | 6 | 0 | 5 | 5 | 0.019 |
| Above Rs.40000 | 8 | 12 | | 13 | 7 | |

# Yates corrected values

Note: categories under the variables were merged together for the computation of chi square analysis.

Table 16 depicts that there was no significant association between selected demographic variables of experimental group and the level of anxiety in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho4)** "There will be no significant association between selected demographic variables and level of Anxiety in pretest and posttest of patients undergoing CABG" was retained.

**Table 17**

**Association between Selected Clinical Variables and Level of Anxiety in Pretest and Posttest in Control Group of Patients Undergoing CABG**

**(N=30)**

| Clinical variables | Pre test | | | Post test | | |
|---|---|---|---|---|---|---|
| | Above Mean | Upto mean | $\chi^2$ p<0.05 | Above mean | Upto Mean | $\chi^2$ p<0.05 |
| **BMI** | | | | | | |
| < 25 | 6 | 9 | 0 | 6 | 9 | 0 |
| >25 | 6 | 9 | | 6 | 9 | |
| **History of Hypertension** | | | | | | |
| No | 6 | 8 | 0.0008 | 6 | 8 | 0.0008 |
| Yes | 7 | 9 | | 7 | 9 | |
| **Duration of Hospitalization** | | | | | | |
| < 5 days | 10 | 17 | - | 10 | 17 | - |
| 5- 10 day | 3 | 0 | | 3 | 0 | |
| **Dietary history** | | | | | | |
| Vegetarian | 8 | 13 | -1.33# | 8 | 14 | -0.69# |
| Non vegetarian | 5 | 4 | | 5 | 4 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **History of Smoking** | | | | | | |
| No | 11 | 17 | - | 11 | 17 | - |
| Yes | 2 | 0 | | 2 | 0 | |
| **History of Alcoholism** | | | | | | |
| Yes | 2 | 2 | - | 2 | 2 | - |
| No | 11 | 15 | | 11 | 15 | |

# Yates corrected values

Note: The clinical variables were merged together for the computation of chi square analysis.

Table 17 shows that there was no significant association between selected clinical variables of control group and level of Anxiety and pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho6)** "There will be no significant association between selected clinical variables and level of anxiety in pretest and posttest of patients undergoing CABG" was retained.

**Table 18**

**Association between Selected Clinical Variables and Level of Anxiety in Pretest and Posttest in Experimental Group of Patients Undergoing CABG**

**(N=30)**

| Clinical variables | Pre test | | | Post test | | |
|---|---|---|---|---|---|---|
| | Above mean | Upto Mean | $\chi^2$ | Above Mean | Upto Mean | $\chi^2$ |
| **BMI** | | | | | | |
| < 25 | 5 | 3 | -0.285# | 5 | 3 | -1.97# |
| >25 | 7 | 15 | | 13 | 9 | |
| **History of Hypertension** | | | | | | |
| No | 5 | 9 | 0.0066 | 6 | 8 | 0.107 |
| Yes | 7 | 9 | | 12 | 4 | |
| **Duration of Hospitalization** | | | | | | |
| < 5 days | 10 | 18 | - | 16 | 12 | - |
| 5- 10 day | 2 | 0 | | 2 | 0 | |
| **Dietary history** | | | | | | |
| Vegetarian | 6 | 10 | 0.0029 | 11 | 5 | 0.036 |
| Non vegetarian | 6 | 8 | | 7 | 7 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **History of Smoking** | | | | | | |
| No | 8 | 15 | -0.84# | 12 | 11 | -0.69# |
| Yes | 4 | 3 | | 6 | 1 | |
| **History of Alcoholism** | | | | | | |
| Yes | 4 | 2 | -0.20# | 6 | 0 | - |
| No | 8 | 16 | | 12 | 12 | |

# Yates corrected values

Note: Categories under the variables were merged together for the computation of chi square analysis.

Table 18 depicts that there was no significant association between selected clinical variables of experimental group and level of anxiety in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho6)** "There will be no significant association between selected clinical variables and level of anxiety in pretest and posttest of patients undergoing CABG" was retained.

**Table 19**

**Association between Selected Demographic Variables and Level of Systolic B.P and Diastolic B.P in Pretest and Posttest in Control Group of Patients Undergoing CABG**

| Demographic Variables | Systolic B.P (n=30) | | | | | | Diastolic B.P (n=30) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre test | | | Post test | | | Pre test | | | Post test | | |
| | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ |
| **Age** | | | | | | | | | | | | |
| 41- 60 yrs | 12 | 11 | -1.19# | 12 | 11 | -1.19# | 8 | 15 | - | 8 | 15 | - |
| 61 – 70 yrs | 5 | 2 | | 5 | 2 | | 5 | 2 | | 5 | 2 | |
| **Educational Status** | | | | | | | | | | | | |
| Till Secondary | 10 | 5 | 0.040 | 10 | 5 | 0.040 | 6 | 8 | 0.008 | 6 | 8 | 0.008 |
| Higher Secondary and above | 7 | 8 | | 7 | 8 | | 7 | 9 | | 7 | 9 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Occupational status** | | | | | | | | | | | | |
| Government and Private job | 10 | 6 | 0.015 | 10 | 6 | 0.015 | 6 | 10 | 0.016 | 6 | 10 | 0.016 |
| Business and others | 7 | 7 | | 7 | 7 | | 7 | 7 | | 7 | 7 | |
| **Income** | | | | | | | | | | | | |
| Upto 40000 | 4 | 3 | 0.00 | 4 | 3 | 0.00 | 4 | 3 | 0.00 | 4 | 3 | 0.00 |
| Above 40000 | 13 | 10 | | 13 | 10 | | 9 | 14 | | 9 | 14 | |

# Yates corrected values

Note: The demographic variables were merged together for the computation of chi square analysis.

Table 19 Inferred that there was no significant association between selected demographic variables of control group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho5)** "There will be no significant association between selected demographic variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

**Table 20**

**Association between Selected Demographic Variables and Level of Systolic B.P and Diastolic B.P in Pretest and Posttest in Experimental Group of Patients Undergoing CABG**

| Demographic Variables | Systolic B.P (n=30) | | | | | | Diastolic B.P (n=30) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre test | | | Post test | | | Pre test | | | Post test | | |
| | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ |
| **Age** | | | | | | | | | | | | |
| 41- 60 yrs | 8 | 8 | 0.02 | 8 | 8 | 0.020 | 7 | 9 | 0.042 | 18 | 8 | 0.02 |
| 61 – 70 yrs | 9 | 5 | | 9 | 5 | | 9 | 5 | | 9 | 5 | |
| **Educational Status** | | | | | | | | | | | | |
| Till Secondary | 8 | 5 | 0.007 | 8 | 5 | 0.007 | 6 | 7 | 0.015 | 7 | 6 | 0.002 |
| Higher Secondary and above | 9 | 8 | | 9 | 8 | | 10 | 7 | | 10 | 7 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Occupational status** | | | | | | | | | | | | |
| Government and Private job | 7 | 3 | - | 7 | 3 | - | 7 | 3 | -0.86[#] | 8 | 2 | -1.27[#] |
| Business and others | 10 | 10 | | 10 | 10 | | 9 | 11 | | 9 | 11 | |
| **Income** | | | | | | | | | | | | |
| Upto 40000 | 7 | 3 | - | 7 | 3 | - | 5 | 5 | 0.002 | 6 | 4 | -1.92[#] |
| Above 40000 | 10 | 10 | | 10 | 10 | | 11 | 9 | | 11 | 9 | |

# Yates corrected values

Note: The demographic variables were merged together for the computation of chi square analysis.

Table 20 Inferred that there was no significant association between selected demographic variables of experimental group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho5)** "There will be no significant association between selected demographic variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

**Table 21**

**Association between Selected Clinical Variables and Level of Systolic B.P and Diastolic B.P in Pretest and Posttest in Control Group of Patients Undergoing CABG**

| Clinical Variables | Systolic B.P (n=30) | | | | | | Diastolic B.P (n=30) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre test | | | Post test | | | Pre test | | | Post test | | |
| | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ |
| **BMI** | | | | | | | | | | | | |
| < 25 | 13 | 2 | - | 13 | 2 | - | 10 | 5 | - | 10 | 5 | - |
| >25 | 4 | 11 | | 4 | 11 | | 3 | 12 | | 3 | 12 | |
| **History of Hypertension** | | | | | | | | | | | | |
| No | 14 | 0 | - | 14 | 0 | - | 13 | 1 | - | 13 | 1 | - |
| Yes | 3 | 13 | | 3 | 13 | | 0 | 16 | | 0 | 16 | |
| **Duration of** | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Hospitalization** | | | | | | | | | | | | |
| < 5 days | 14 | 13 | - | 14 | 13 | - | 10 | 17 | - | 10 | 17 | - |
| 5- 10 day | 3 | 0 | | 3 | 0 | | 3 | 0 | | 3 | 0 | |
| **Dietary history** | | | | | | | | | | | | |
| Vegetarian | 13 | 8 | 0.00 | 13 | 8 | 0.00 | 9 | 12 | 0.00 | 9 | 12 | 0.00 |
| Non vegetarian | 4 | 5 | | 4 | 5 | | 4 | 5 | | 4 | 5 | |
| **History of Smoking** | | | | | | | | | | | | |
| No | 15 | 13 | - | 15 | 13 | - | 11 | 17 | - | 11 | 17 | - |
| Yes | 2 | 0 | | 2 | 0 | | 2 | 0 | | 2 | 0 | |
| **History of Alcoholism** | | | | | | | | | | | | |
| No | 13 | 13 | - | 13 | 13 | - | 9 | 17 | - | 9 | 17 | - |
| yes | 4 | 0 | | 4 | 0 | | 4 | 0 | | 4 | 0 | |

#Yates corrected values

Note: The clinical variables were merged together for the computation of chi square analysis.

Table 21 shows that there was no significant association between selected clinical variables of control group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho7)** "There will be no significant association between selected clinical variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

**Table 22**

**Association between Selected Clinical Variables and Level of Systolic B.P and Diastolic B.P in Pretest and Posttest in Experimental Group of Patients Undergoing CABG**

| Clinical Variables | Systolic B.P (n=30) | | | | | | Diastolic B.P (n=30) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pre test | | | Post test | | | Pre test | | | Post test | | |
| | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ | Upto Mean | Above Mean | $\chi^2$ |
| **BMI** | | | | | | | | | | | | |
| < 25 | 3 | 5 | -0.38# | 4 | 4 | -1.18# | 4 | 4 | -1.96# | 5 | 3 | -1.3# |
| >25 s | 14 | 8 | | 15 | 7 | | 12 | 10 | | 12 | 10 | |
| **History of Hypertension** | | | | | | | | | | | | |
| No | 13 | 3 | -1.63# | 15 | 1 | -0.95# | 9 | 7 | -1.4# | 10 | 6 | -1.2# |
| Yes | 4 | 10 | | 4 | 10 | | 7 | 7 | | 7 | 7 | |
| **Duration of Hospitalization** | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| < 5 days | 17 | 11 | - | 18 | 10 | 0.00 | 15 | 13 | - | 15 | 13 | - |
| 5- 10 day | 0 | 2 | | 1 | 1 | | 1 | 1 | | 2 | 0 | |
| **Dietary history** | | | | | | | | | | | | |
| Vegetarian | 9 | 7 | 0.0 | 10 | 6 | 0.0 | 9 | 7 | -1.4# | 10 | 6 | -1.2# |
| Non vegetarian | 8 | 6 | | 9 | 5 | | 7 | 7 | | 7 | 7 | |
| **History of Smoking** | | | | | | | | | | | | |
| No | 13 | 10 | -1.62# | 13 | 10 | -0.061# | 12 | 11 | -1.94# | 12 | 11 | -1.2# |
| Yes | 3 | 4 | | 6 | 1 | | 4 | 3 | | 5 | 2 | |
| **History of Alcoholism** | | | | | | | | | | | | |
| No | 12 | 12 | 0.00 | 13 | 11 | 0.00 | 12 | 12 | -1.34# | 13 | 11 | -1.72# |
| yes | 5 | 1 | | 6 | 0 | | 4 | 2 | | 4 | 2 | |

# Yates corrected values

Note: The clinical variables were merged together for the computation of chi square analysis.

Table 22 shows that there was no significant association between selected clinical variables of experimental group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho7) "**There will be no significant association between selected clinical variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

## Summary

This chapter dealt with analysis and interpretation of data obtained by the researcher. The analysis of the results showed that in the experimental group of the level of anxiety reduced after administration of virtual reality therapy, when compared to the level of anxiety before the administration of the therapy. This implied that therapy has significant effect on reduction in the level of anxiety among the experimental group of patients undergoing CABG.

# CHAPTER V

# DISCUSSION

An experimental study to assess the effectiveness of virtual reality therapy upon anxiety and B.P among patients undergoing Coronary artery bypass grafting at selected hospital, Chennai.

The study was carried out using a true experimental research design upon 60 patients undergoing CABG at Apollo Main Hospital, Chennai. Data was collected using tools such as Beck anxiety inventory, Proforma to record B.P and level of Acceptability scale. Intervention (VRT) was administered only to experimental group of patients undergoing CABG. Posttest was conducted on the $5^{th}$ pod in control and experimental group of patients undergoing CABG.

Collected data was analyzed using appropriate descriptive (frequency and percentage, mean and standard deviation) and inferential statistics (paired t test, independent t test, correlation and chi square).

## Objectives of the Study

1. To assess the level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.
2. To determine the effectiveness of virtual reality therapy by comparing the pre and posttest scores of anxiety and blood pressure in control and experimental groups of patients undergoing CABG.
3. To assess the level of acceptability of experimental group patients undergoing CABG regarding virtual reality therapy.

4. To determine the correlation between level of anxiety and blood pressure scores among patients undergoing CABG in pretest and posttest.
5. 5.To find out the association between selected demographic variables and level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.
6. To find out the association between selected clinical variables and level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.

**The discussion is presented under the following headings.**

- Demographic variables of control and experimental group of patients undergoing CABG
- Level of anxiety among patients undergoing CABG
- Effectiveness of virtual reality therapy upon anxiety among patients undergoing CABG
- Frequency and percentage distribution of level of satisfaction among experimental group of patients undergoing CABG.
- Correlation between anxiety and B.P among experimental and control group of patients undergoing CABG.
- Association between the selected demographic variables and level of anxiety and B.P in control and experimental group of patients undergoing CABG in pretest and posttest.
- Association between the selected clinical variables and level of anxiety and B.P in control and experimental group of patients undergoing CABG in pretest and posttest.

**Demographic variables of control and experimental group of patients undergoing CABG**

Majority of the patients were males (93.33%, 80%) and their income was above 40000/ month (76.67%, 66.67%) in control and experimental group respectively. With regard to other variables, they were aged between 61yrs to 71 yrs (23.33%, 46.67%), had higher secondary education (33.33%, 36.67%) and involved in business (33.33%, 40%) in control and experimental group respectively.

**The first objective was to assess the level of anxiety and B.P among control and experimental group of patients undergoing CABG in pretest and posttest.**

The findings of the study in control group reveals that, that Majority of patients had mild level of anxiety in control (86.66%, 90%) and experimental group (86.67%, 96.66%) in pretest and posttest.

Majority of patients had normal diastolic B.P (83.33%, 83.33%) and had prehypertension in systolic B.P (46.67%, 50%) in experimental group in pretest and posttest. However, less than half of patients had prehypertension in systolic B.P (43.33%, 40%), had prehypertension in diastolic B.P (43.33%, 43.33%) in control group in pretest and posttest.

The findings of the study are consistent with that of the study conducted in south India by Ramesh (2017) among patients who were undergoing CABG surgery. It was a cross sectional study, when the Samples were collected by using convenience sampling technique in tertiary care referral hospital. Out of 140 patients, 118 (84%) had preoperative anxiety before CABG surgery. Identification of the preoperative anxiety in patients undergoing CABG surgery is essential because it helps the professionals and nurses to develop effective and appropriate interventions. As a

health care professional, it is nurses responsibility to assess the level of anxiety through screening and diagnosis till the termination of therapeutic relationship.

**The second objective was to determine the effectiveness of virtual reality therapy by comparing the pre and posttest scores of anxiety and B.P in control and experimental groups among patients undergoing CABG.**

The findings depict that the mean and the standard deviation of pre-test and post-test anxiety scores of control group of patients (M= 19.7& SD= 2.7, M= 19.17& SD= 2.33) is higher than the experimental group (M= 17.37 & SD= 3.99, M= 14.83 & SD= 3.29) which is statistically significant with a 't' value of 5.59 at $p<0.001$. This can be attributed to the effectiveness of virtual reality therapy upon anxiety. Hence the null hypothesis **(Ho1)** "There will be no significant difference between pre-test and post-test anxiety scores in control and experimental group of patients undergoing CABG" was rejected.

Mean and standard deviation of systolic B.P in control group did not show any significant reduction in posttest (M121.33, SD 13.32), when compared with pretest (M121.3, SD 12.95). In experimental group also mean and standard deviation of systolic B.P did not show any significant reduction in posttest (M 122.66, SD 12.26), when compared with pretest (M 123.66, SD 12.63).

Mean and standard deviation of diastolic B.P in control group did not show any significant reduction in posttest (M 76.3, SD 8.89), when compared with pretest (M 76, SD 8.55). In experimental group also mean and standard deviation of diastolic B.P did not show any significant reduction in posttest (M 65.33, SD 8.40), when compared with pretest (M 65.66, SD 8.20). Hence the null hypothesis **(Ho2)** "There

will be no significant difference between pretest and posttest B.P scores in control and experimental group of patients undergoing CABG" was retained.

The findings of the study are consistent with that of a study conducted by Mossa et al (2014). It was a validation study to explore the effectiveness of virtual reality therapy upon virtual reality for pain management in cardiac surgery. Surgical anxiety creates stress and causes complications in surgical procedures. This experiment explores use of Virtual reality therapy to reduce postoperative distress in patients. Sixty-seven patients were monitored at IMSS la raza national medical center within 24 hrs of cardiac surgery. They concluded that VR stimulation reduced pain and physiological variation like vital signs. The study shows that virtual reality is able to provoke emotional responses in patients undergoing cardiac surgeries with high level of anxiety.

Virtual reality therapy is a newer method in reducing anxiety in the field of newer modalities which has a positive effect on creating a real or imaginary world. Virtual reality therapy has also proven to be effective in rehabilitation.

To sum up, it can be concluded that virtual reality therapy is one of the important psychological therapy in the field of medicine through which various mental and physical problems can be cured, if provided in safe environment to the patients to develop positive mentality.

**The third objective was to assess the level of acceptability of experimental group patients undergoing CABG regarding virtual reality therapy.**

While making a plan for any intervention, it is important to consider the participant's acceptability, to ensure their cooperation and to continue the intervention

even posttest the completion of the study. Acceptability arises from a person when therapy is balanced between the study participant's choice and professional responsibility and high level of acceptability can be obtained by the participants.

Here in the present study, the researcher found that, all the patients undergoing CABG had high level of Acceptability (100%) regarding virtual reality therapy. All participants equally felt more energetic and enthusiastic while they participated in the research procedure.

Similar findings are also reported by Debika et al (2017) who reported that virtual reality therapy was accepted by all patients with cancer.

**The fourth objective was to determine the correlation between the anxiety and B.P scores among patients undergoing CABG in pretest and posttest**.

There was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group and experimental group in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho3)**" There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG" was retained.

This is a congruent with study conducted by Eileen (2001), a prospective study to assess the blood pressure and symptoms of depression and anxiety in normotensive adults. The study conducted with 433 normotensive patients. They concluded that their study did not support the hypothesis that symptoms of anxiety are risk factors for future development of hypertension.

**The fifth objective was to find out the association between selected demographic variables and level of anxiety and B.P among the control and experimental group of patients undergoing CABG in pretest and posttest**.

It is an evident from study results that demographic variables such as age, gender, educational status, occupational status, income of patients undergoing CABG had not revealed any significant association in control and experimental group in pretest and posttest ($p>0.05$).

Hence the null hypothesis (Ho4) "There will be no significant association between selected demographic variables and level of anxiety in pretest and posttest of patients undergoing CABG" was retained.

Hence the null hypothesis **(Ho5)** "There will be no significant association between selected demographic variables and B.P scores in pretest and posttest of patients undergoing CABG" was retained.

This is congruent with study conducted by Hildrum (2007), which considered the association of blood pressure with anxiety and depression. Cross sectional study was conducted with 799 samples in the hospital Anxiety and Depression Scale as part of a general health. They concluded that blood pressure with anxiety and depression is not caused by cardiovascular disease.

**The sixth objective was to find out the association between selected clinical variables and level of anxiety and blood pressure among the control and experimental group of patients undergoing CABG in pretest and posttest.**

It is evident from the study results that clinical variables such as body mass index, history of hypertension, duration of days in hospitalization, dietary history,

history of smoking and history of alcoholism of patients undergoing CABG had not revealed any significant association of control and experimental group in pretest and posttest.

Hence the null hypothesis **(Ho6)** "There will be no significant association between selected clinical variables and level of anxiety in pretest and posttest of patients undergoing CABG" was retained.

Hence the null hypothesis **(Ho7)** "There will be no significant association between selected clinical variables and B.P scores in pretest and posttest of patients undergoing CABG" was retained.

This is a congruent with study conducted by Maatouk et al (2016), association of hypertension with depression and generalized anxiety symptoms in large population based sample of older adults. Cohort study conducted with 3124 randomly chosen participants aged between 57- 84 years. Depression and general anxiety severity were assessed using validated questionnaire. They concluded that no association was found between symptoms of anxiety and hypertension.

## Summary

This chapter dealt with the objectives of the study, major findings of the demographic variables of patients undergoing CABG, level of anxiety pretest and posttest the virtual reality therapy, level of satisfaction regarding the virtual reality therapy and association between selected demographic variables and the level of anxiety of patients undergoing CABG.

# CHAPTER VI

# SUMMARY, CONCLUSION, IMPLICATIONS, RECOMMENDATIONS

The heart of the research project lies in reporting the findings. This is the most creating and demanding of the study. This particular chapter deals with the summary, conclusion, implications, recommendations and limitations of the study

## Summary

The major objective of the study is to assess the effectiveness of virtual reality therapy upon anxiety and blood pressure among patients undergoing CABG at selected hospital, Chennai.

### Objectives of the Study

1. To assess the level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.
2. To determine the effectiveness of virtual reality therapy by comparing the pre and posttest scores of anxiety and blood pressure in control and experimental group of patients undergoing CABG.
3. To assess the level of acceptability of experimental group patients undergoing CABG regarding virtual reality therapy.
4. To determine the correlation between level of anxiety and blood pressure scores among patients undergoing CABG in pretest and posttest.
5. 5.To find out the association between selected demographic variables and level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.

6. To find out the association between selected clinical variables and level of anxiety and blood pressure among control and experimental group of patients undergoing CABG in pretest and posttest.

**Null hypotheses**

**$H_o$1:** There will be no significant difference between pretest and posttest anxiety scores in control and experimental group of patients undergoing CABG.

**$H_o$2:** There will be no significant difference between pretest and posttest B.P scores in control and experimental group of patients undergoing CABG.

**$H_o$3:** There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG.

**$H_o$4:** There will be no significant association between selected demographic variables and level of anxiety in pretest and posttest of patients undergoing CABG.

**$H_o$5:** There will be no significant association between selected demographic variables and level of B.P in pretest and posttest of patients undergoing CABG.

**$H_o$6:** There will be no significant association between selected clinical variables and level of anxiety in pretest and posttest of patients undergoing CABG.

**$H_o$7**: There will be no significant association between selected clinical variables and level of B.P in pretest and posttest of patients undergoing CABG.

The conceptual framework for this study is based on **Modified Kings Goal Attainment Model (1981).** According to Imogene King, nursing is defined as a process of action, reaction and interaction where by nurses and clients share information about their perception in nursing education. Through perceptions and communications, they identify the problem through which they set goals and take necessary action. Modified Kings Goal Attainment model is based on the

interpersonal and social system including perception, judgement, action, reaction, interaction, transaction and feedback.

An extensive literature review and guidance by expert formed foundations for the development of the tool. An experimental research approach was used to achieve the objectives of the study.

True experimental research design used for this study. It was conducted at Apollo main hospital, Chennai among 60 patients undergoing CABG.

The present study was conducted on 60 patients undergoing CABG in a selected hospital, Chennai. Beck anxiety scale was administered to all the patients. By systematic simple random sampling technique, 30 patients in each control and experimental group were selected by the researcher for data collection. Settings were allotted to the control and experimental group. The data collection was done for period of 6 weeks on selected samples.

The study was conducted in Apollo Main Hospital, Nungambakkam. The data collection was carried out for a period of 6 weeks from January 22th, 2018 to February 28, 2018. The patients were randomized using systematic Simple Random Technique on the basis of selection criteria. The purpose and duration of the study was explained to the samples to obtain their cooperation and informed consent was taken from participants. Pretest was done by using beck anxiety scale and Proforma to record B.P from both group.

The patient was made to sit on the bed and asked to wear the Cardboard glasses and then VR meditation sceneries were played through mobile application. They were followed the scenes one by one where the natural sceneries and boating

were displayed. The music's and the solar system gives audio effect to get more interest towards the relaxation. During preoperative period, virtual reality therapy was given in the morning at 8 am and evening at 4 pm before taking routine medications consecutively for 2 days. It was continued in their postoperative period for 2 days till they were shifted to ward. No intervention was provided to the control group. Posttest was done on 5$^{th}$ POD by using Beck anxiety scale and Proforma to record B.P from both groups, respectively. Level of acceptability was obtained from experimental group of patients undergoing CABG.

## Major findings of the study

### Frequency and Percentage Distribution of Demographic Variables in the Control and Experimental Group among Patients undergoing CABG

The study findings show that majority of the patients were males (93.33%, 80%) and their income was above 40000/ month (76.67%, 66.67%) in control and experimental group respectively. With regard to other variables, they were aged between 61yrs to 71 yrs (23.33%, 46.67%), had higher secondary education (33.33%, 36.67%) and involved in business (33.33%, 40%) in control and experimental group, respectively.

### Frequency and Percentage Distribution of Clinical Variables in the Control and Experimental Group among Patients Undergoing CABG

The study finding shows that majority of patients had illness for less than 5 years (100%, 90%), no history of smoking (93.33%, 76.67%), had no history of alcoholism (86.66%, 80%), hospitalized for 5- 10 days (90%, 93.33%) in control and experimental group respectively. Around half of them, had hypertension (53.33%, 53.33%), not taking antihypertensive drugs (46.47%, 56.67%), the body mass index

was between 25- 29 (43.33%, 56.67%) and involved in moderate physical activity (46.47%, 46.67%), were vegetarian (66.67%, 53.33%) in control and experimental group respectively.

**Frequency and Percentage Distribution of Pretest and Posttest anxiety scores in Control and Experimental Group of Patients Undergoing CABG**

The study finding shows that Majority of patients had mild level of anxiety in control (86.66%, 90%) and experimental group (86.67%, 96.66%) in pretest and posttest.

**Frequency and percentage distribution of B.P scores in pretest and posttest in control and experimental group of patients undergoing CABG**

Majority of patients had normal diastolic B.P (83.33%, 83.33%) and had prehypertension in systolic B.P (46.67%, 50%) in experimental group in pretest and posttest. However, less than half of patients had prehypertension in systolic B.P (43.33%, 40%), had prehypertension in diastolic B.P (43.33%, 43.33%) in control group in pretest and posttest. With regard to other variables, they had normal systolic B.P in experimental group in pretest and posttest (30%, 30%).

**Comparison of mean and standard deviation of pretest and posttest anxiety scores in control and experimental group of patients undergoing CABG**

The study findings depict that there was no significant difference in the mean anxiety score and standard deviation of control group of patients between pretest (19.7 $\pm$ 2.70) and posttest (19.17$\pm$ 2.33) at ($p > 0.05$). Whereas in experimental group, there was significant difference in the mean anxiety score and standard deviation between pretest (19.7 $\pm$ 2.70) and posttest (19.17$\pm$ 2.33) at ($p < 0.001$). Anxiety

scores were less in posttest than pretest in experimental group. It can be attributed to the effectiveness of virtual reality therapy on reducing anxiety.

**Comparison of Mean and Standard Deviation of Anxiety Scores Between pretest and posttest in Control and Experimental Group of Patients Undergoing CABG**

The study findings show that mean and the standard deviation of pre-test and post-test anxiety scores of control group of patients (M= 19.7& SD= 2.7, M= 19.17& SD= 2.33) is higher than the experimental group (M= 17.37 & SD= 3.99, M= 14.83 & SD= 3.29) which is statistically significant with a 't' value of 5.59 at $p<0.001$. This can be attributed to the effectiveness of virtual reality therapy upon anxiety. Hence the null hypothesis **(Ho1)** "There will be no significant difference between pre-test and post-test anxiety scores in control and experimental group of patients undergoing CABG" was rejected.

**Comparison of mean and standard deviation of B.P scores between pretest and posttest in control and experimental group of patients undergoing CABG**

The study findings depict that mean and standard deviation of systolic B.P in control group did not show any significant reduction in posttest (M121.33, SD 13.32), when compared with pretest (M121.3, SD 12.95). In experimental group also mean and standard deviation of systolic B.P did not show any significant reduction in posttest (M 122.66, SD 12.26), when compared with pretest (M 123.66, SD 12.63).

Mean and standard deviation of diastolic B.P in control group did not show any significant reduction in posttest (M 76.3, SD 8.89), when compared with pretest (M 76, SD 8.55). In experimental group also mean and standard deviation of diastolic B.P did not show any significant reduction in posttest (M 65.33, SD 8.40), when compared with pretest (M 65.66, SD 8.20). Hence the null hypothesis **(Ho2)** "There

will be no significant difference between pretest and posttest B.P scores in control and experimental group of patients undergoing CABG" was retained.

**Frequency and percentage distribution of level of acceptability regarding virtual reality therapy among experimental group of patients undergoing CABG**

The study reveals that all the patients in experimental group have highly accepted the virtual reality therapy provided by the researcher (100%).

**Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in pretest**

There was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in pretest ($p>0.05$). Hence the null hypothesis **(Ho3)** "There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG" was retained.

**Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in posttest**

There was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in control group in posttest ($p>0.05$). Hence the null hypothesis **(Ho3)** "There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG" was retained.

**Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in pretest**

There was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in pretest

(p>0.05). Hence the null hypothesis **(Ho3)** “There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG” was retained.

**Correlation between anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in posttest**

There was no correlation between variables such as anxiety, systolic B.P and diastolic B.P among patients undergoing CABG in experimental group in posttest (p>0.05). Hence the null hypothesis **(Ho**3) “There will be no significant correlation between anxiety and B.P scores in pretest and posttest of patients undergoing CABG” was retained.

**Association between selected demographic variables and the level of anxiety in pretest and posttest in control group of patients undergoing CABG**

There was no significant association between selected demographic variables of control group and level of anxiety in pretest and posttest (p>0.05). Hence, the null hypothesis **(Ho4)** “There will be no significant association between the selected demographic variables and the level of Anxiety in pretest and posttest of patients undergoing CABG” was retained.

**Association between selected demographic variables and level of anxiety in pretest and posttest in experimental group of patients undergoing CABG**

There was no significant association between selected demographic variables of experimental group and level of anxiety in pretest and posttest (p>0.05). Hence the null hypothesis **(Ho4)** “There will be no significant association between selected demographic variables and level of Anxiety in pretest and posttest of patients undergoing CABG” was retained.

**Association between selected clinical variables and level of anxiety in pretest and posttest in control group of patients undergoing CABG**

There was no significant association between selected clinical variables of control group and level of Anxiety in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho6)** "There will be no significant association between selected clinical variables and level of anxiety in pretest and posttest of patients undergoing CABG" was retained.

**Association between selected clinical variables and level of anxiety in pretest and posttest in experimental group of patients undergoing CABG**

There was no significant association between selected clinical variables of experimental group and level of anxiety in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho6)** "There will be no significant association between selected clinical variables and level of anxiety in pretest and posttest of patients undergoing CABG" was retained.

**Association between selected demographic variables and level of systolic B.P and diastolic B.P in pretest and posttest in control group of patients undergoing CABG**

There was no significant association between selected demographic variables of control group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho5)** "There will be no significant association between selected demographic variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

**Association between selected demographic variables and level of systolic B.P and diastolic B.P in pretest and posttest in experimental group of patients undergoing CABG**

There was no significant association between the selected demographic variables of experimental group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho5)** "There will be no significant association between selected demographic variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

**Association between selected clinical variables and level of systolic B.P and diastolic B.P in pretest and posttest in control group of patients undergoing CABG**

There was no significant association between selected clinical variables of control group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho7)** "There will be no significant association between selected clinical variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

**Association between selected clinical variables and level of systolic B.P and diastolic B.P in pretest and posttest in experimental group of patients undergoing CABG.**

There was no significant association between selected clinical variables of experimental group and level of B.P in pretest and posttest ($p>0.05$). Hence the null hypothesis **(Ho7)** "There will be no significant association between selected clinical variables and level of B.P in pretest and posttest of patients undergoing CABG" was retained.

## Conclusion

Virtual reality therapy is a psychological therapy to help patients to improve their insight. This study findings reveal that virtual reality therapy is effective in reducing anxiety. It is known fact that patients undergoing CABG, are anxious and unable to cope up with stress. Virtual reality therapy is a simple noninvasive intervention, which can be practiced by the patient as a routine procedure to reduce anxiety which will in turn improve their psychological wellbeing, coping and compliances.

## Implication

The findings of the study have implications on the different branches of nursing profession i.e. nursing practice, nursing education, nursing administration, nursing research by assessing the effectiveness of Virtual Reality therapy upon anxiety and blood pressure.

### Nursing Practice

The findings of the study revealed that the patients undergoing CABG had mild level of anxiety and the virtual reality therapy is an effective therapeutic module that helps patient to reduce the anxiety. The study also depicts that mild level of anxiety experienced by all the patients irrespective of any demographic variables. This indicates the need of patients undergoing CABG to practice varied categories of therapeutic modalities to reduce the anxiety and B.P. The virtual reality therapy is an effective module that has a tremendous effect on the brain of the participants which lead them into a track of productive life.

As a role of critical care nurse is changing from time to time based on emerging trends and varied scope, she must be technical expert in performing virtual reality therapy in improving client's quality of life span.

**Nursing Education**

The collaboration between the theory and practice is a crucial fact in the nursing education. At present, the nursing education focus on emerging trends and innovation to enhance the nursing care. The nursing education curriculum should be organized in a manner that helps the pupil to adapt well to the profession and advance in their future career. The education to the student and nurses in the clinical area could be in the form of continuing nursing education programme on issues and trends.

**Nursing Administration**

Nurse administrators have an important responsibility in organizing continuing nursing education and short term course for preparing the nurse to get specialized in using virtual reality therapy in patients undergoing CABG. Nurse administrator should conduct periodical review meeting to evaluate the quality of nursing care.

**Nursing Research**

In India, evidence based practice is not sufficient to reduce anxiety in patients. To this concern, the student nurses should be encouraged to undertake projects in the area of measures in reducing anxiety among patients undergoing CABG and to disseminate the findings through appropriate channels.

**Recommendations**

- The study may be conducted with larger samples for generalization of the results.
- The study can be replicated in different settings.
- The same study can be conducted using other different forms of virtual goggle or oculus rift.

- A comparative study can be done using usual relaxation techniques and virtual reality therapy to assess the anxiety among various groups.
- A comparative study can be done to assess the effectiveness among various psychosocial intervention including VRT.
- A comparative study can be conducted between private and government settings.

**LIMITATIONS**

- The study findings cannot be generalized due to small sample size.
- Extraneous variables cannot always be controlled.

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## APPENDIX I

## LETTER SEEKING PERMISSION TO CONDUCT STUDY

**Apollo College of Nursing**
(A unit of Apollo Hospitals Educational Trust)
(Recognised by the Indian Nursing Council and Affiliated to the Tamil Nadu Dr. M.G.R. Medical University, Chennai)

**CO/0340/17** **21.11.2017**

**To**

Dr. Muralidharan. M,
Director of Medical Education,
Apollo Main Hospitals,
Greams Road,
Chennai 600 006.

Dear Dr Kavin,
Can you help Ms Sheeba please?

Dr. MURALIDHARAN, M.
MB.,MRCS(EDIN),FRCS(GLAS).,
FMAS(LAPROSCOPIC SURGERY)
DIRECTOR MEDICAL EDUCATION
APOLLO HOSPITALS, CHENNAI.

**Respected Sir,**

**Sub:-**To request permission for Research study.

Greetings! As a part of the curriculum requirement of our M.Sc (N) II year student Ms. Sheeba.N has selected the following title for her research study.

**"An Experimental Study to Assess the Effectiveness of virtual reality therapy upon anxiety and blood pressure among patients undergoing CABG at selected hospitals, Chennai"**

So I kindly request your good selves to permit her to conduct study in your esteemed Hospital.

Thanking You,

**Dr. LATHA VENKATESAN**
**PRINCIPAL**

Regd. Office : 21, Greams Lane Off, Greams Road, Chennai - 600 006. Ph. : +91-44-2829 3333, 2829 0200 Website : www.apollohospitalseducation.com
Unit Office : Vanagaram to Ambattur Main Road, Ayanambakkam, Chennai - 600 095. Phone : 044 - 2653 4387 Fax : 044 - 2653 4923 / 2653 4386

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# APPENDIX II

# ETHICAL CLEARANCE LETTER

**Institutional Ethics Committee - Clinical Studies**
**Apollo Hospitals, Chennai**
**Reg. No. ECR/37/Inst/TN/2013/RR-16**

Full AAHRPP Accreditation

Apollo HOSPITALS TOUCHING LIVES

**//Duplicate Copy//**

7 Dec 2017

To,
Ms. Sheeba.N,
First year, M.Sc. (Nursing),
Department of Medical Surgical Nursing,
Apollo College of Nursing, Chennai.

**Ref:** An Experimental Study to Assess the Effectiveness of Virtual Reality Therapy upon Anxiety and Blood Pressure among Patients undergoing CABG at Selected Hospitals Chennai.

**Sub: Final Full Board** (Subsequent to your letters dated 20 Nov 2017).

Dear Ms. Sheeba.N,

The Institutional Ethics Committee-Clinical Studies has received the following document submitted by you related to the conduct of the above-referenced study -

- Project Proposal

The Institutional Ethics Committee-Clinical Studies reviewed and discussed the project proposal documents submitted by you at a meeting held on 1st Dec 2017.

The following Institutional Ethics Committee – Clinical Studies members were present at the meeting held on 1st Dec 2017 at 11am at New Conference Hall, Main Block, 5th Floor, Apollo Main Hospital, Greams Road, Chennai – 600006.

| S. No | Name | M/F | Qualification | Affiliated Y/N | Designation | Position in the Committee |
|---|---|---|---|---|---|---|
| 1. | Dr. Manjula Datta | F | MBBS,D.C.H, M.D. (Pediatrics), M.Sc. (Design Measurement & Evaluation), FRCP (Edin) | No | Independent Research Consultant | Chairperson |
| 2. | Dr. Rema Menon | F | MBBS | Yes | HOD, Blood Bank Transfusion Services | Member Secretary (Physician) |
| 3. | Dr. P. Nalini Rao | F | MA, M. Phil, PGDHRM, Ph.D | No | Social Worker | Social Scientist |
| 4. | Dr. Pradeep Kumar | M | MBBS, M.D. (Pharmacology) | Yes | Pharmacologist | Pharmacologist |

**Apollo Hospitals Enterprises Limited**
21, Greams Lane, Off Greams Road, Chennai - 600 006, Tamil Nadu, India. Tel : +91-44 2829 5045 Fax : +91-44-2829 4449
E-mail: ecapollochennai@gmail.com

| | | | | | | |
|---|---|---|---|---|---|---|
| 5. | Dr. K. Sathyamurthi | M | M.A. (Social Work), PGDHRM, Ph.D | No | Head Department of Social Work | Social Scientist |
| 6. | Dr. Nirumal Rakkesh* | M | M.B.B.S, M.D. (Pharmacology) | Yes | Pharmacologist | Pharmacologist |
| 7. | Ms. Maimoona Badsha | F | B.A,B.L | No | Lawyer | Lawyer |
| 8. | Mrs.Malathy Chandrasekhar | F | B.A. (Hindi) | No | Home Based Teacher | Layperson |
| 9. | Dr. Rathna Devi | F | MBBS, DMRT | Yes | Sr. Consultant Radiation Oncologist | Clinician |

**Alternate Member*

The Institutional Ethics Committee-Clinical Studies reviewed the proposal, its methodology and design of the study. The proposed thesis work is approved in the presented form without any modifications.

The Institutional Ethics Committee-Clinical Studies review and approval of the report is only to meet their academic requirement and will not amount to any approval of the conclusion / recommendations as conclusive, deserving adoption and implementations, in any form, in any health care institution.

The Institutional Ethics Committee-Clinical Studies is constituted and works as per ICH-GCP, ICMR and revised Schedule Y guidelines.

Regards,

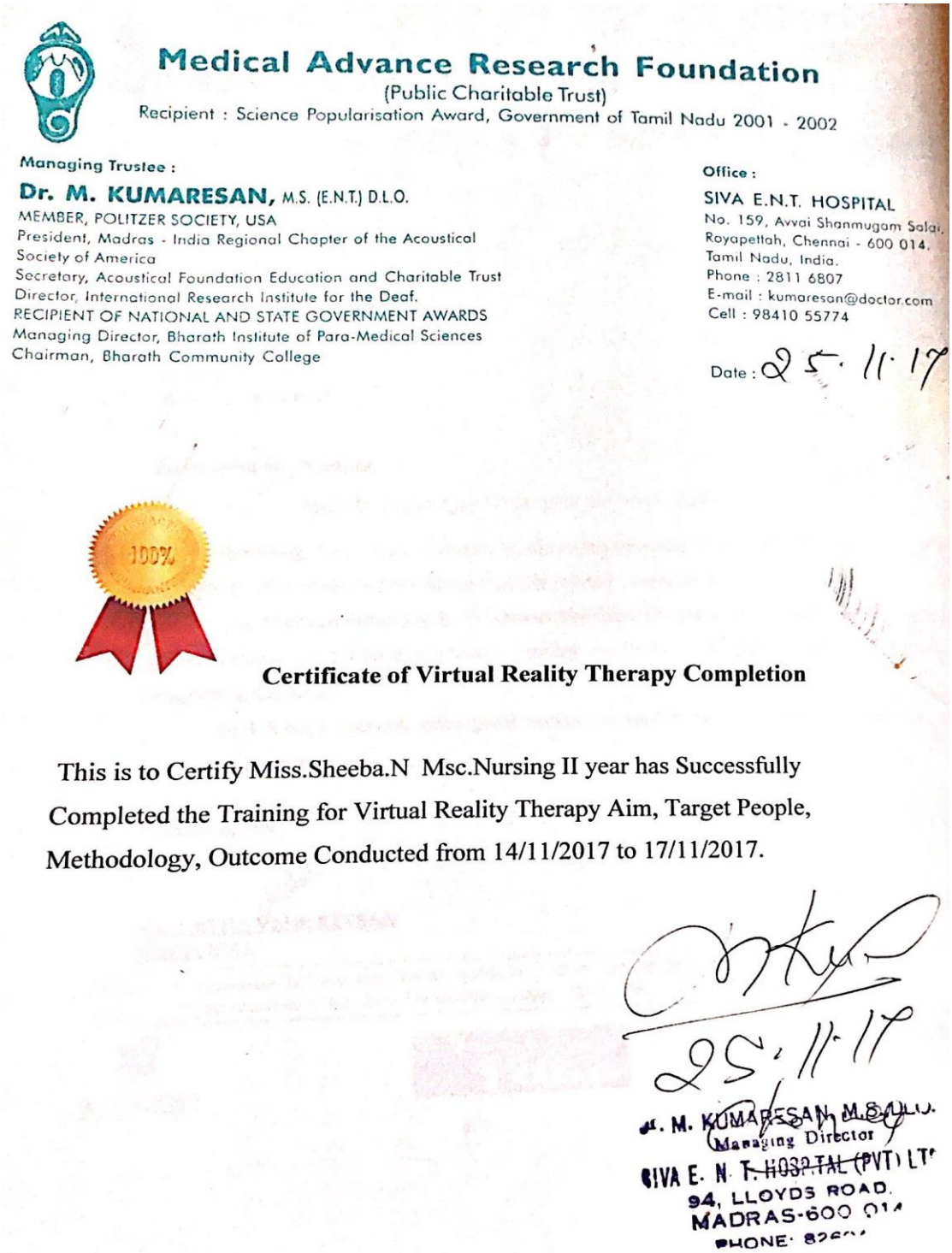
**Date:** 07/12/17.

**Dr. Rema Menon,**
Member Secretary,
Institutional Ethics Committee-Clinical Studies,
Apollo Hospitals,
Chennai.

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE CLINICAL STUDIES
APOLLO HOSPITALS, AHEL
CHENNAI, TAMILNADU.

## APPENDIX III

## CERTIFICATE FOR VIRTUAL REALITY THERAPY



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Royapettah, Chennai - 600 014.
Tamil Nadu, India.
Phone : 2811 6807
E-mail : kumaresan@doctor.com
Cell : 98410 55774

Date : 25.11.17

100%

**Certificate of Virtual Reality Therapy Completion**

This is to Certify Miss.Sheeba.N Msc.Nursing II year has Successfully Completed the Training for Virtual Reality Therapy Aim, Target People, Methodology, Outcome Conducted from 14/11/2017 to 17/11/2017.

25.11.17

Dr. M. KUMARESAN, M.S., D.L.O.
Managing Director
SIVA E. N. T. HOSPITAL (PVT) LTD.
94, LLOYDS ROAD.
MADRAS-600 014
PHONE: 826...

## APPENDIX IV

## LETTER SEEKING PERMISSION FOR CONTENT VALIDITY

**From**

Ms. Sheeba. N,

M.Sc Nursing, II year,

Apollo College of Nursing,

Chennai-600095.

**To**

Through proper channel

Dr. Latha Venkatesan,

The Principal,

Apollo College of Nursing,

Chennai.

**Subject: - Request for opinion and suggestions of experts for establishing content Validity of research tool.**

Respected Madam,

Greetings! As a part of the curriculum requirement the following research title is selected for the study.

"**An Experimental Study to Assess the Effectiveness of Virtual reality therapy upon Anxiety and Blood Pressure among patients undergoing CABG at selected hospital, Chennai."**With regard to this, may I kindly request you to validate my research tools for its appropriateness and relevance. I would be grateful if you would validate the tool and give your valuable opinion and suggestions where ever required.

Thanking You

**Date:** 11/8/2017 Your's sincerely,

**Place:** Chennai Sheeba.N.

## APPENDIX V

## LIST OF THE EXPERTS FOR CONTENT VALIDITY

1. **Dr. Latha Venkatesan, M. Sc (N), M. Phil (N), Ph. D (N), MBA (HM), Ph.D. (HDFS),**

   Principal cum Professor,

   Apollo College Of Nursing,

   Chennai -95.

2. **Dr. Lizy Sonia, M. Sc (N), Ph. D (N),**

   Vice-Principal,

   Apollo College Of Nursing,

   Chennai -95.

3. **Dr. K Vijayalakshmi M. Sc (N), M.A. (Psy), MBA, Ph. D (N),**

   HOD, Mental Health Nursing,

   Apollo College Of Nursing,

   Chennai -95.

4. **Dr. Prakash Chand Jain**

   **MD., DNB (CARDIO),**

   Sr. Consultant- Cardiologist,

   Apollo Hospitals, Chennai-600006.

5. **Dr. M Kumaresan MBBS, DLO, MS- ENT**,

   Consultant, Shiva ENT Hospital,

   Chennai.

## APPENDIX VI

## CONTENT VALIDITY CERTIFICATE

This is to certify that tools and content for the research study developed by Ms. Sheeba.N, M.Sc. (N) II year student of Apollo College of Nursing, Chennai, for her dissertation "**An Experimental Study to Assess the Effectiveness of Virtual Reality Therapy upon Anxiety and blood pressure among patients undergoing CABG at Selected Hospital, Chennai"** was validated and approved and found suitable for the study.

**Signature of the expert**

**Name and Designation**

## APPENDIX VII

## RESEARCH PARTICIPANTS CONSENT FORM

Dear Participants,

I, Ms. Sheeba.N, student of M.Sc. (N) II year of Apollo College of Nursing, Chennai-95, is going to conduct a research as a part of the curriculum. The following statement has been selected for the purpose of the study, "**An Experimental Study to Assess the Effectiveness of Virtual Reality Therapy upon anxiety and blood pressure among patients undergoing CABG at Selected Hospital, Chennai."** The purpose of the study will be helpful in reducing the anxiety and blood pressure among patients undergoing CABG

I hereby seek your consent and kind co-operation to participate in the study. Please be frank and honest in your responses. The information collected will be kept confidential and anonymity will be maintained.

**Signature of the Researcher**

I…….do hereby give my consent to participate and undergo the study.

Place:

Date:

Signature of the Participant

# APPENDIX VIII

## CERTIFICATE FOR ENGLISH EDITING

TO WHOMSOEVER IT MAY CONCERN

This is to certify that the dissertation entitled **" An Experimental Study to Assess the Effectiveness of Virtual Reality Therapy upon Anxiety and Blood Pressure among Patients undergoing CABG in Select Hospitals, Chennai"** submitted by Ms. Sheeba. N M.Sc (N). II year student, Apollo College of Nursing was edited for English language appropriateness.

Signature

Dr. K.N. SHOBA, M.A.,M.Phil.,Ph.D.,
Assistant Professor
Department of English
College of Engineering
Anna University, Chennai - 25.

## APPENDIX IX

## LETTER SEEKING PERMISSION TO USE STUDY TOOL



Gmail

Sheeba Davincy <sheebadavincyholyspirit@gmail.com>

**Permission request**

1 message

**Sheeba Davincy** <sheebadavincyholyspirit@gmail.com> Tue, Jun 12, 2018 at 3:11 PM
To: Kelly Devinney <kelly.devinney13@gmail.com>

Respected sir

I am doing my msc nursing at Apollo college of nursing . As a part of our study requirement , v need to do an individual research . I am interested in conducting a study on the title " an effectiveness of virtual reality therapy upon anxiety and blood pressure among patients undergoing cabg at selected hospital chennai".

So I kindly request u to give permission to use your Beck Anxeity scale for my research study

Thanking you
Yours faithfully
Sheeba.N
Msc nursing

Gmail Sheeba Davincy <sheebadavincyholyspirit@gmail.com>

**BAI**
2 messages

**Beck, Aaron** <abeck@pennmedicine.upenn.edu> Tue, Jun 12, 2018 at 9:55 PM
To: "sheebadavincyholyspirit@gmail.com" <sheebadavincyholyspirit@gmail.com>

Hello,

I am writing on behalf of Aaron T. Beck, M.D. in response to your request for permission to use the BAI. Dr. Beck has assigned full rights for most of his scales, including the BAI to Pearson Assessment (formerly named Harcourt Assessment). In order to receive more information and obtain permission to use this/these scales, you may visit the website for Dr. Beck's scales: http://www.beckscales.com. The scales can be purchased from there. To contact customer service regarding permission or use, click on "Contact" at the very top of the page. If it applies, you can also fill out the "Research Assistance Program" form in the same section for a possible discount.

Since Pearson owns the rights to the BAI, you will need to obtain permission from them rather than Dr. Beck.

Best of luck with your project,
Molly Finkel

–

Aaron T. Beck, M.D.

University Professor Emeritus of Psychiatry

University of Pennsylvania

**Sheeba Davincy** <sheebadavincyholyspirit@gmail.com> Tue, Jun 12, 2018 at 10:11 PM
To: "Beck, Aaron" <abeck@pennmedicine.upenn.edu>

Thank you for your help!
[Quoted text hidden]

## APPENDIX X

## PLAGIARISM ORIGINALITY REPORT

| | |
|---|---|
| | **Plagiarism Detector – Originality Report** |
| | Plagiarism Detector project: [ http:// plagiarism-detector.com ] Application core version : 622 |

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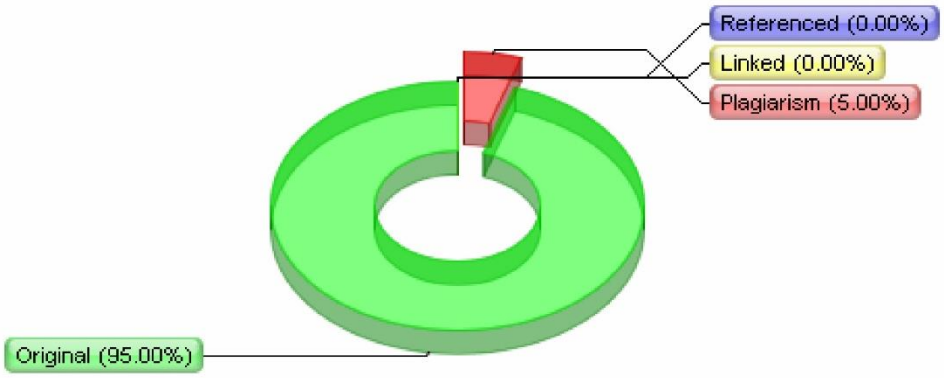


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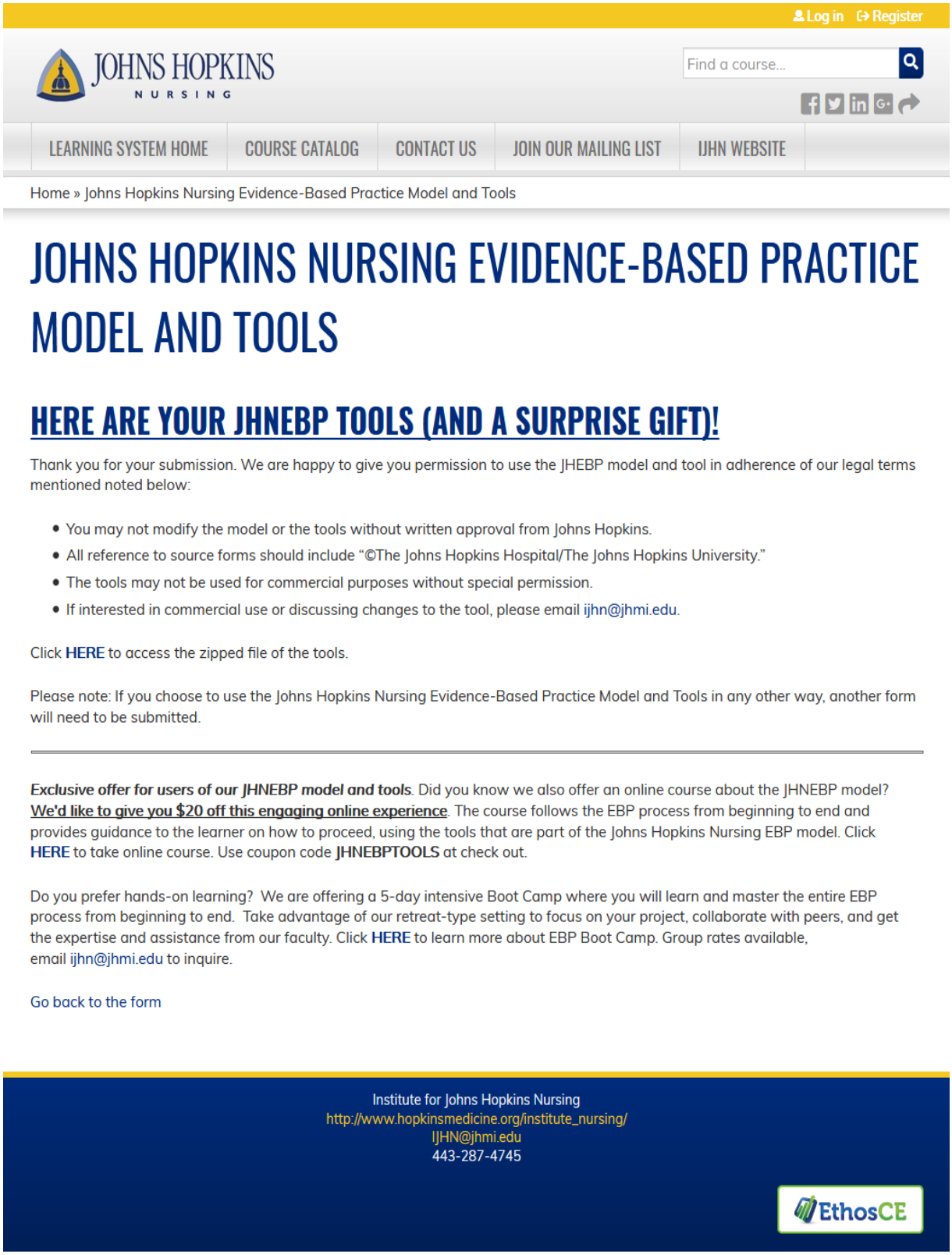
## APPENDIX - XI

## EVIDENCE - BASED PRACTICE MODEL AND TOOLS



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# JOHNS HOPKINS NURSING EVIDENCE-BASED PRACTICE MODEL AND TOOLS

## HERE ARE YOUR JHNEBP TOOLS (AND A SURPRISE GIFT)!

Thank you for your submission. We are happy to give you permission to use the JHEBP model and tool in adherence of our legal terms mentioned noted below:

- You may not modify the model or the tools without written approval from Johns Hopkins.
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Click **HERE** to access the zipped file of the tools.

Please note: If you choose to use the Johns Hopkins Nursing Evidence-Based Practice Model and Tools in any other way, another form will need to be submitted.

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EthosCE

## APPENDIX XII

## DEMOGRAPHIC VARIABLES PROFORMA

**Purpose**

This Proforma is used by the researcher to collect information on the demographic variables of patients such as age, Gender, educational status, occupational status, monthly family income.

**Instruction**

The researcher will use the self-administered method to collect the information from the patients.

**Sample no** ☐

**1. Age of the patient** ☐

**2. Gender of the patient**

2.1 Male ☐

2.2 Female ☐

**3. Educational status**

3.1 Primary education ☐

3.2 Secondary education ☐

3.3 Higher secondary ☐

3.4 Graduate and above ☐

3.5 Illiterate ☐

**4. Occupational status**

4.1 Government job ☐

4.2 Private Job ☐

4.3 Business ☐

4.4 Others ☐

**5. Monthly family income**

5.1 Upto 40000/ month

5.2 Above 40000/ month

## APPENDIX XIII

## CLINICAL VARIABLE PROFORMA

**Purpose**

The Proforma is used by the researcher to collect information on the clinical variables of patients such as a height and weight, body mass index, duration of present illness, history of taking anti-hypertensive drugs, no of days in hospitalization, nature of physical activity, history of comorbid illness, dietary history, history of smoking, history of alcoholism.

**Instruction**

The researcher collects the information by interviewing the patients by asking questions in the interview form and observation. Please be frank and free in answering it. Confidential and anonymity will be maintained

Sample no ☐

1**. Height……. Cms** ☐

**2. Weight …… Kgs** ☐

**3. Body mass index (kg/cm2**) ☐

3.1) <25 ☐

3.2) 25-29 ☐

3.3) 30-34 ☐

3.4) 35-39 ☐

**4. Duration of present illness**

4.1 < 5 years ☐

4.2 5-10 years ☐

4.3 More than 10 years ☐

**5. History of hypertension**

5.1 No

5.2 Yes

6**. History of taking anti-hypertensive drugs**

6.1 No

6.2 Regular

6.3 Occasional

**7. No of days in hospitalization**

7.1 < 5 days

7.2 5- 10 days

7.3 More than 10 days

**8. Nature of physical activity**

8.1 Sedentary

8.2 Moderate

8.3 Heavy

**9. History of comorbid illness**.

9.1 Renal failure

9.2 Asthma

9.3 Diabetes mellitus

9.4 Others (specify)

**10. Dietary history**

10.1 Vegetarian

10.2 Non Vegetarian

**11. History of smoking**

11.1 No

11.2 Occasional

11.3 yes (mention year) ☐

**12. History of alcoholism**

12.1 No ☐

12.2 Occasional ☐

12.3 Yes (mention year) ☐

## APPENDIX XIV

## BECK ANXIETY INVENTORY

| Sl no | Items | Not at all | Mild | Moderate | Severe |
|---|---|---|---|---|---|
| 1 | Difficulty in breath | 0 | 1 | 2 | 3 |
| 2 | Difficulty in sleeping at night | 0 | 1 | 2 | 3 |
| 3 | Dizzy or light headed | 0 | 1 | 2 | 3 |
| 4 | Face flushed | 0 | 1 | 2 | 3 |
| 5 | Faint | 0 | 1 | 2 | 3 |
| 6 | Fear of dying | 0 | 1 | 2 | 3 |
| 7 | Fear of losing control | 0 | 1 | 2 | 3 |
| 8 | Fear if worst happening | 0 | 1 | 2 | 3 |
| 9 | Feeling of choking | 0 | 1 | 2 | 3 |
| 10 | Feeling hot | 0 | 1 | 2 | 3 |
| 11 | Hands trembling | 0 | 1 | 2 | 3 |
| 12 | Heart bounding | 0 | 1 | 2 | 3 |
| 13 | Indigestion | 0 | 1 | 2 | 3 |
| 14 | Nervous | 0 | 1 | 2 | 3 |
| 15 | Numbness | 0 | 1 | 2 | 3 |
| 16 | On edge | 0 | 1 | 2 | 3 |
| 17 | Racing thoughts | 0 | 1 | 2 | 3 |
| 18 | Shaky | 0 | 1 | 2 | 3 |
| 19 | Sweating | 0 | 1 | 2 | 3 |
| 20 | Terrified | 0 | 1 | 2 | 3 |
| 21 | Unable to relax | 0 | 1 | 2 | 3 |
| 22 | Unsteady | 0 | 1 | 2 | 3 |

**TOTAL SCORE**

**INTERPRETATION**

**Score of 0-21 = Low anxiety**

**Score of 22-35 =Moderate anxiety**

**Score of 36 and above= Potentially concerning levels of activity**

## APPENDIX XV

## PROFORMA TO RECORD BLOOD PRESSURE

**Instruction**

The Researcher will record the B.P value of patients undergoing CABG in pretest and posttest

| SL NO | OBSERVATIONS | B.P | |
|---|---|---|---|
| | | SYSTOLIC PRESSURE | DIASTOLIC PRESSURE |
| 1 | PRE TEST | | |
| 2 | POST TEST ($5^{th}$ POD) | | |

## APPENDIX XVI

## BLUE PRINT FOR RATING SCALE TO ASSESS THE LEVEL OF ACCEPTABILITY AMONG PATIENTS RECEIVING VIRTUAL REALITY THERAPY

| SL NO | CONTENT | ITEMS | TOTAL ITEMS | PERCENTAGE |
|---|---|---|---|---|
| 1 | Virtual reality therapy | 1,2,3,4 | 4 | 33.3% |
| 2 | Outcome of virtual reality therapy | 5,6,7,8 | 4 | 33.3% |
| 3 | Researcher approach | 9,10,11,12 | 4 | 33.3% |

## APPENDIX XVII

## RATING SCALE FOR ASSESSING LEVEL OF ACCEPTABILITY ON VIRTUAL REALITY THERAPY IN EXPERIMENTAL GROUP PATIENTS

**Purpose:**

The rating scale is designed to assess the level of acceptability of the participants. This is developed by the investigator to assess the acceptability of virtual reality therapy among pre-operative patients. This is 4-point score ranging from 4-1 (highly acceptable, acceptable, unacceptable and highly unacceptable)

**Instruction**

There are 12 items. Kindly read the items, response extend from highly acceptable, acceptable, unacceptable and highly unacceptable, put a tick mark against the answer. Describe your responses frankly. The responses will be kept confidential and used for research purpose only.

| S no | Items | Highly acceptable | Acceptable | Unacceptable | Highly unacceptable |
|---|---|---|---|---|---|
| **1** | I feel more comfortable about virtual reality therapy | | | | |
| **2** | Duration of virtual reality therapy is sufficient for me | | | | |
| **3** | I like to do it regularly | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **4** | It improves my self-image | | | | |
| **5** | I experienced decrease in mental stress and anxiety | | | | |
| **6** | My mind is relaxed after virtual reality therapy | | | | |
| **7** | It improves my inner feelings and peace of mind | | | | |
| **8** | I am able to cope up with my stress effectively | | | | |
| **9** | The researcher explained clearly about the intervention | | | | |
| **10** | The researcher cleared all doubts I had about intervention | | | | |
| **11** | I am satisfied with the manner of demonstration | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **12** | The researcher was present throughout the procedure | | | | |

**Scoring:**

**Highly acceptable-4**

**Acceptable-3**

**Unacceptable-2**

**Highly unacceptable-1**

**The total score is converted into percentage and graded below**

| Score | Interpretation |
|---|---|
| Highly acceptable | 76-100% |
| Acceptable | 51-75% |
| Unacceptable | 25-50% |
| Highly unacceptable | Below 25% |

## APPENDIX XVIII

## CONTENT OF VIRTUAL REALITY THERAPY

| | | |
|---|---|---|
| Topic | : | Virtual reality Therapy |
| Group | : | Patients undergoing CABG at Apollo Main Hospital, Chennai |
| Place | : | Apollo Main Hospital, Chennai. |
| Duration of teaching | : | 15 minutes for twice daily |
| Method of teaching | : | Lecture and demonstration |
| Educator | : | M Sc (N) II year student, Apollo College of Nursing, Chennai |

## OBJECTIVES

At the end of the session patient and their caregiver will be able to

- Understand what virtual reality therapy is.
- Justify the need for virtual reality therapy. Among patients suffering from cancer.
- Practice virtual reality therapy.
- Demonstrate the use of virtual cardboard goggle headset by own selves.
- Ventilate their feelings during and after virtual reality therapy.

| Specific objectives | Content | Learning activities |
|---|---|---|
| To brief the topic of virtual reality therapy | **Introduction:**<br>Virtual reality therapy is a form of technology which creates computer generated worlds or immersive environment, which people can interact with it. Virtual is artificial and reality is what we experience. So, the term virtual reality basically means “Near reality”.<br>Virtual Reality Therapy has also proven to be effective in rehabilitation of lesion patients suffering from neglect. However, the Virtual Reality Therapy can be done from anywhere in the world if given the necessary tools. There are many individuals who require therapy due to various form of immobilization. Virtual reality therapy was invented by Morton H. Eilig in 1956 and was introduced in medicine in 1990 by Dr. Ralph Larson. With numerous advancement in the field of technology, virtual reality also has become easier to be used and affordable by people of all level. Present Virtual reality therapy is the use of a Cardboard goggle invented by Google Cardboard company for the use in its most easiest from in anywhere by anybody. | Listening |

| | | |
|---|---|---|
| To justify the nature of Virtual reality therapy | **Nature of virtual reality therapy:**<br><br>Virtual reality therapy is form of technology that forms a three dimensional world or an immersive environment which people can interact with. The term Virtual reality also means "Near reality". It is an immersive, interactive, multisensory, viewer centered, sensor projector viewed or non-viewed theatre environment which can be explored and interacted with by a person. The person becomes the part of the virtual world or is immersed within the therapeutic environment. In this environment they can manipulate an object or perform a series of actions which are controlled by the gyro sensors, accelerometer, of the device. Thereby the person feels relief from his problems by permanently registering the positive effects of the brain. Virtual reality therapy is the simulation of physical presence in the real or imaginary world seeing the world through different eyes. | - Lecture cum discussion<br>- Listening |

| | | |
|---|---|---|
| To specify the aims of virtual reality therapy | **Aims of virtual reality:**<br>• To promote and protect people from various stress related events.<br>• To reduce the occurrence of various stress related diseases.<br>• To make people more assertive towards their self-image**.** | Listening |
| State the uses of virtual reality therapy | **Uses of virtual reality therapy:**<br>• To help patent overcome insomnia.<br>• To register positive effects in the brain.<br>• Rehabilitative programme for<br>✓ Vertigo, tinnitus<br>✓ Vocal injuries.<br>✓ Stress headache<br>✓ Dementia<br>✓ Parkinson's disease<br>✓ Behavioral problems<br>✓ Cancer treatments | Listening |

| | | |
|---|---|---|
| To specify the advantages of the virtual reality therapy | **Advantages Of Virtual Reality Therapy**<br>• Prevention of chronic disease<br>• Distraction from pain<br>• Reliving stress and stress related disorders.<br>• Improve coping mechanism<br>• Modulation of the effects of stimuli perceived by brain. | Listening |
| To make people understand the need of virtual reality therapy | **Need for Virtual Reality Therapy Upon Anxiety and Blood Pressure among patients undergoing CABG**<br>The nervous feeling before an important life event or during a difficult situation is a natural echo of the original fight or flight reaction. It can still be essential to survival. When facing a potential harmful or worrying triggers or anxiety are not a normal feeling.<br>The reason for anxiety while undergoing major cardiac surgery may be due to fear and anxiety on the outcomes of the surgery as a vital organ, the heart, is involved. While waiting for major heart surgery significant physical and psychological stressors, including higher anxiety, uncertainties, depression, and worries regarding outcome of | - Lecture cum discussion<br>- Listening |

| | | |
|---|---|---|
| Demonstrate VR meditation | surgery may even lead to pain, shortness of breath, and alteration in vital signs. These factors are aggravating the symptoms of existing disease and can lead to complicated recovery after the surgery (Guo, East, &Arthur, 2012).<br><br>Virtual Reality Therapy is a Relaxation technique that helps patients with various psychological problems. The obvious advantages of Virtual Reality Exposure Therapy have make it more desirable in the field of treatment. Virtual Reality Therapy can be conducted from anywhere in the world, so those who are not able to reach the technology mobility issues virtual reality can be brought to them. Another major advantage is fewer ethical concerns than in-vivo exposure therapy.<br><br>**HOW VIRTUAL REALITY PROCEDURE IS PERFORMED**<br><br>Central to cognitive therapy are Cognitive change techniques, sometimes called "cognitive restructuring". These procedures help patients challenge and correct negative thinking patterns about certain circumstances that trigger dysfunctional emotional responses. VR meditations are often used adjunctively to cognitive techniques to provide anxious individual with a skill to decrease symptoms of over arousal**.** | |

| | | |
|---|---|---|
| Describe virtual reality environment | **VR MEDITATION**<br><br>Virtual Reality MEDITATION is a relaxation therapy where the patient experienced flurry of new gadgets are set to change the way to meditate. It was composed of walking in beach, boating, and natural sceneries. There was enjoyable music's and enjoyable mystic dark nebula, it was provided with 'cardboard glasses' to watch the game and mind was relaxed. More specifically designed environments with user friendly atmosphere can be created which allow for border virtual reality usage in treatment and research.<br><br>The patient was made to sit on the bed and wear the cardboard glasses. They were followed the scenes by one by one where the natural sceneries and boating. The music's and the solar system gives audio effect to get more interest towards the relaxation. In preoperatively, virtual reality therapy was given in the morning at 8 am and evening at 4pm before taking routine medications consecutively for 2 days. It was continued in their postoperative period to till 2$^{nd}$ POD. | - Lecture cum discussion<br>- Listening |

| | | |
|---|---|---|
| | **VIRTUAL ENVIRONMENT**<br>**Successful virtual environment depends on the smooth integration of**<br>✓ Visual display<br>✓ Head position<br>✓ Hand position<br>✓ Force feedback<br>✓ Sound input and output | - Lecture cum discussion<br>- listening |
| To instruct people about the use of cardboard goggle headset | **How The Cardboard Goggle Is Use:**<br>The present virtual reality therapy requires a virtual cardboard headset and a smart mobile that have either a gyro sensor or an accelerometer or both. In the Google play store numerous cardboard supportive applications are available which are free downloadable. After downloading the free application place the mobile phone in the cardboard room and attach a headphone set. Let the patient wear the headset a get immersed into the imaginer interactive 3-D world. | Listening |

| | | |
|---|---|---|
| To make people aware about the benefits of virtual reality therapy | **Benefits of Virtual Reality Therapy:**<br>• Stimulates sleep<br>• Reduces symptomatic distresses in patients suffering from chronic illness<br>• Improve concentration and memory.<br>• Reduces insomnia and induces sleep at night<br>• Improve decision making skills.<br>• Improves self esteem<br>• Good relaxation therapy for mind | Listening |
| | **CONCLUSION:**<br>Virtual reality therapy is a new method of treating patient with multiple stress related symptoms. Also it is very effective in reducing pain sensation for patients who are suffering from chronic pain.<br>Virtual simulation also stimulates the physical presence of the individual in a real or imaginary world. More specially designed environments with user friendly atmosphere can be created which allow for broader virtual reality usage in treatment and research.<br>This can also be done in monitored controlled, censored, projector viewed theatre environment, tailored to the needs of each individual patient. It permanently register positive effect to the brain | |

## APPENDIX XIX

## DATA CODING SHEET

## DEMOGRAPHIC VARIABLES PROFORMA

**SN-Sample no** ☐

**1. AGE-Age of the patient** ☐

**2. GEN-Gender of the patient**

2.1 Male ☐

2.2 Female ☐

**3. EDU-Educational status**

3.1 Primary education ☐

3.2 Secondary education ☐

3.3 Higher secondary ☐

3.4 Graduate and above ☐

3.5 Illiterate ☐

**4. OS-Occupational status**

4.1 Government Job ☐

4.2 Private Job ☐

4.3 Business ☐

4.4 Others ☐

**5. MFI- Monthly family income**

5.1 Upto 40000/ month ☐

5.2 Above 40000/ month ☐

## APPENDIX XX

## CLINICAL VARIABLE PROFORMA

**SN**-Sample no

1**. HEI-Height……. Cms**

**2. WEI-Weight ……Kgs**

**3. BMI-Body mass index (kg/cm2**)

3.1) <25

3.2) 25-29

3.3) 30-34

3.4) 35-39

**4. DPI-Duration of present illness**

4.1 < 5 years

4.2 5-10 years

4.3 More than 10 years

**5. HOH- History of hypertension**

5.1 No

5.2 Yes

6**. HTAD-History of taking anti-hypertensive drugs**

6.1 No

6.2 Regular

6.3 Occasional

**7. NDH-No of days in hospitalization**

7.1 < 5 days

7.2 5- 10 days

7.3 More than 10 days

**8. NPA - Nature of Physical Activity**

8.1 Sedentary

8.2Moderate

8.3 Heavy

**9. HCI-History of comorbid illness**.

9.1 Renal failure

9.2 Asthma

9.3 Diabetes mellitus

9.4 Others (specify)

**10. DH-Dietary history**

10.1 Vegetarian

10.2 Non Vegetarian

**11. HOS-History of smoking**

11.1 No

11.2 Occasional

11.3 yes (mention year)

**12. HOA- History of alcoholism**

12.1 No

12.2 Occasional

12.3 Yes (mention year)

## APPENDIX XXI
## MASTER CODING SHEET FOR CONTROL GROUP

| | DEMOGRAPHIC VARIABLE | | | | | CLINICAL VARIABLE | | | | | | | | | | | | ANXEITY SCORE | | BLOOD PRESSURE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S.NO | AGE | GEN | EDU | OS | MFI | HEI | WEI | BMI | DPI | HOH | ATAD | NOH | NPA | HCI | DH | HOS | HOA | PRETEST | POSTTEST | PRE TEST | POSTTEST |
| 1 | 1.2 | 2.1 | 3.3 | 4.3 | 5.2 | 168 | 58 | 3.1 | 4.1 | 5.1 | 6.1 | 7.2 | 8.2 | 9.2 | 10.2 | 11.1 | 12.1 | 21 | 20 | 110/70 | 110/70 |
| 2 | 1.3 | 2.1 | 3.3 | 4.3 | 5.2 | 172 | 69 | 3.1 | 4.1 | 5.1 | 6.1 | 7.2 | 8.2 | 9.2 | 10.2 | 11.2 | 12.2 | 22 | 21 | 100/60 | 100/60 |
| 3 | 1.3 | 2.1 | 3.3 | 4.2 | 5.2 | 160 | 72 | 3.2 | 4.1 | 5.1 | 6.1 | 7.2 | 8.2 | 9.1 | 10.1 | 11.2 | 12.2 | 26 | 24 | 110/70 | 110/70 |
| 4 | 1.3 | 2.1 | 3.1 | 4.4 | 5.1 | 160 | 58 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.2 | 9.1 | 10.2 | 11.1 | 12.1 | 29 | 27 | 100/70 | 100/70 |
| 5 | 1.3 | 2.1 | 3.2 | 4.4 | 5.1 | 148 | 58 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.3 | 9.1 | 10.2 | 11.1 | 12.1 | 18 | 18 | 140/90 | 140/90 |
| 6 | 1.1 | 2.1 | 3.4 | 4.2 | 5.2 | 173 | 90 | 3.3 | 4.1 | 5.2 | 6.2 | 7.1 | 8.3 | 9.1 | 10.2 | 11.1 | 12.1 | 19 | 19 | 140/90 | 140/90 |
| 7 | 1.2 | 2.1 | 3.3 | 4.3 | 5.2 | 162 | 65 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.3 | 9.1 | 10.2 | 11.1 | 12.1 | 21 | 21 | 140/90 | 140/90 |
| 8 | 1.2 | 2.1 | 3.3 | 4.3 | 5.2 | 163 | 61 | 3.1 | 4.1 | 5.2 | 6.2 | 7.1 | 8.3 | 9.1 | 10.2 | 11.1 | 12.1 | 22 | 22 | 130/80 | 140/90 |
| 9 | 1.1 | 2.1 | 3.4 | 4.3 | 5.2 | 168 | 62 | 3.1 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.2 | 11.1 | 12.1 | 18 | 17 | 140/90 | 140/90 |
| 10 | 1.1 | 2.1 | 3.3 | 4.2 | 5.2 | 155 | 65 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.3 | 9.1 | 10.1 | 11.1 | 12.1 | 19 | 17 | 130/80 | 130/80 |
| 11 | 1.2 | 2.1 | 3.2 | 4.1 | 5.2 | 158 | 60 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.3 | 9.1 | 10.1 | 11.1 | 12.1 | 20 | 20 | 130/80 | 130/80 |
| 12 | 1.1 | 2.1 | 3.2 | 4.1 | 5.2 | 160 | 72 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 21 | 21 | 130/80 | 130/80 |
| 13 | 1.3 | 2.1 | 3.3 | 4.1 | 5.2 | 170 | 72 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 21 | 20 | 130/80 | 130/80 |
| 14 | 1.2 | 2.1 | 3.1 | 4.1 | 5.2 | 165 | 62 | 3.1 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 20 | 19 | 120/80 | 120/80 |
| 15 | 1.1 | 2.1 | 3.4 | 4.3 | 5.2 | 176 | 91 | 3.3 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 21 | 19 | 130/80 | 130/80 |
| 16 | 1.2 | 2.1 | 3.3 | 4.3 | 5.1 | 163 | 72 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 16 | 16 | 130/80 | 130/80 |
| 17 | 1.2 | 2.2 | 3.3 | 4.4 | 5.1 | 150 | 55 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 19 | 19 | 130/80 | 130/80 |
| 18 | 1.1 | 2.1 | 3.4 | 4.3 | 5.2 | 163 | 55 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 21 | 20 | 110/70 | 110/70 |
| 19 | 1.1 | 2.1 | 3.3 | 4.2 | 5.2 | 160 | 65 | 3.2 | 4.1 | 5.1 | 6.1 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 20 | 19 | 100/60 | 100/60 |
| 20 | 1.3 | 2.2 | 3.2 | 4.4 | 5.1 | 172 | 72 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 17 | 16 | 110/70 | 110/70 |
| 21 | 1.2 | 2.1 | 3.2 | 4.3 | 5.2 | 165 | 71 | 3.2 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 17 | 17 | 110/70 | 110/70 |
| 22 | 1.2 | 2.1 | 3.4 | 4.3 | 5.2 | 160 | 55 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 19 | 19 | 110/70 | 110/70 |
| 23 | 1.2 | 2.1 | 3.4 | 4.1 | 5.1 | 163 | 52 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 18 | 18 | 110/70 | 110/70 |
| 24 | 1.3 | 2.1 | 3.1 | 4.1 | 5.1 | 155 | 53 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 18 | 18 | 110/70 | 110/70 |
| 25 | 1.1 | 2.1 | 3.2 | 4.1 | 5.2 | 169 | 72 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 19 | 19 | 140/80 | 140/80 |
| 26 | 1.2 | 2.1 | 3.2 | 4.2 | 5.2 | 162 | 70 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 18 | 18 | 120/80 | 120/80 |
| 27 | 1.2 | 2.1 | 3.2 | 4.2 | 5.2 | 158 | 55 | 3.1 | 4.1 | 5.2 | 6.2 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 16 | 16 | 120/80 | 120/80 |
| 28 | 1.2 | 2.1 | 3.2 | 4.2 | 5.2 | 167 | 65 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 18 | 18 | 120/80 | 120/80 |
| 29 | 1.2 | 2.1 | 3.2 | 4.2 | 5.2 | 167 | 65 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 19 | 19 | 120/70 | 120/70 |
| 30 | 1.2 | 2.1 | 3.2 | 4.2 | 5.2 | 170 | 65 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.2 | 10.2 | 11.1 | 12.1 | 18 | 18 | 110/60 | 110/60 |

## APPENDIX XXII
## MASTER CODING SHEET FOR EXPERIMENTAL GROUP

| | DEMOGRAPHIC VARIABLE | | | | | CLINICAL VARIABLE | | | | | | | | | | | | ANXEITY SCORE | | BLOOD PRESSURE | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S.NO | AGE | GEN | EDU | OS | MFI | HEI | WEI | BMI | DPI | HOH | ATAD | NOH | NPA | HCI | DH | HOS | HOA | PRETEST | POSTTEST | PRE TEST | POSTTEST |
| 1 | 1.3 | 2.1 | 3.4 | 4.2 | 5.1 | 167 | 70 | 3.2 | 4.1 | 5.1 | 6.1 | 7.2 | 8.2 | 9.2 | 10.2 | 11.1 | 12.1 | 21 | 18 | 110/50 | 110/60 |
| 2 | 1.2 | 2.1 | 3.3 | 4.4 | 5.1 | 167 | 65 | 3.1 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 22 | 17 | 130/60 | 130/60 |
| 3 | 1.2 | 2.1 | 3.4 | 4.2 | 5.2 | 179 | 83 | 3.2 | 4.1 | 5.1 | 6.1 | 7.1 | 8.2 | 9.1 | 10.2 | 11.1 | 12.2 | 26 | 20 | 120/50 | 120/50 |
| 4 | 1.2 | 2.1 | 3.2 | 4.3 | 5.1 | 154 | 44 | 3.1 | 4.1 | 5.1 | 6.1 | 7.2 | 8.2 | 9.1 | 10.1 | 11.3 | 12.1 | 29 | 24 | 130/70 | 120/50 |
| 5 | 1.3 | 2.1 | 3.4 | 4.2 | 5.1 | 162 | 72 | 3.2 | 4.1 | 5.2 | 6.3 | 7.1 | 8.2 | 9.1 | 10.2 | 11.1 | 12.1 | 13 | 10 | 110/60 | 110/60 |
| 6 | 1.3 | 2.1 | 3.4 | 4.4 | 5.2 | 158 | 70 | 3.2 | 4.2 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.2 | 11.1 | 12.1 | 15 | 14 | 140/60 | 140/60 |
| 7 | 1.3 | 2.2 | 3.3 | 4.4 | 5.2 | 153 | 75 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.1 | 9.1 | 10.2 | 11.1 | 12.1 | 11 | 9 | 130/60 | 130/60 |
| 8 | 1.2 | 2.1 | 3.3 | 4.1 | 5.2 | 158 | 59 | 3.1 | 4.1 | 5.2 | 6.2 | 7.1 | 8.1 | 9.2 | 10.1 | 11.3 | 12.1 | 10 | 9 | 140/60 | 140/60 |
| 9 | 1.3 | 2.1 | 3.2 | 4.3 | 5.1 | 173 | 90 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.1 | 9.2 | 10.2 | 11.1 | 12.1 | 14 | 12 | 130/60 | 130/60 |
| 10 | 1.3 | 2.2 | 3.3 | 4.4 | 5.1 | 145 | 57 | 3.2 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 16 | 13 | 120/70 | 120/70 |
| 11 | 1.1 | 2.1 | 3.2 | 4.3 | 5.2 | 141 | 52 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.2 | 10.1 | 11.1 | 12.1 | 14 | 14 | 110/80 | 110/80 |
| 12 | 1.2 | 2.2 | 3.4 | 4.1 | 5.2 | 150 | 69 | 3.3 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.2 | 10.2 | 11.1 | 12.1 | 17 | 15 | 110/60 | 110/60 |
| 13 | 1.3 | 2.2 | 3.2 | 4.1 | 5.1 | 169 | 65 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 15 | 12 | 120/70 | 120/70 |
| 14 | 1.3 | 2.1 | 3.3 | 4.2 | 5.2 | 175 | 69 | 3.1 | 4.1 | 5.2 | 6.2 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 18 | 15 | 140/80 | 140/80 |
| 15 | 1.1 | 2.1 | 3.2 | 4.3 | 5.1 | 160 | 60 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.2 | 9.1 | 10.2 | 11.1 | 12.1 | 18 | 14 | 140/70 | 120/70 |
| 16 | 1.2 | 2.1 | 3.2 | 4.3 | 5.2 | 141 | 60 | 3.3 | 4.1 | 5.2 | 6.1 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 15 | 13 | 140/60 | 140/60 |
| 17 | 1.2 | 2.1 | 3.3 | 4.3 | 5.2 | 169 | 95 | 3.3 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.2 | 10.2 | 11.1 | 12.1 | 18 | 16 | 140/80 | 140/80 |
| 18 | 1.3 | 2.1 | 3.4 | 4.2 | 5.2 | 170 | 96 | 3.3 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.2 | 11.1 | 12.1 | 16 | 12 | 130/70 | 130/70 |
| 19 | 1.2 | 2.1 | 3.3 | 4.3 | 5.2 | 170 | 82 | 3.2 | 4.1 | 5.2 | 6.2 | 7.1 | 8.2 | 9.1 | 10.2 | 11.1 | 12.1 | 13 | 12 | 120/80 | 120/80 |
| 20 | 1.3 | 2.1 | 3.2 | 4.4 | 5.1 | 165 | 70 | 3.2 | 4.1 | 5.2 | 6.1 | 7.1 | 8.1 | 9.1 | 10.2 | 11.1 | 12.1 | 17 | 13 | 110/70 | 110/70 |
| 21 | 1.3 | 2.2 | 3.1 | 4.4 | 5.1 | 160 | 65 | 3.2 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 17 | 15 | 100/60 | 100/60 |
| 22 | 1.3 | 2.2 | 3.3 | 4.2 | 5.2 | 165 | 70 | 3.2 | 4.2 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 17 | 15 | 110/60 | 110/60 |
| 23 | 1.3 | 2.1 | 3.2 | 4.3 | 5.2 | 160 | 72 | 3.2 | 4.1 | 5.1 | 6.1 | 7.1 | 8.2 | 9.1 | 10.1 | 11.2 | 12.2 | 17 | 16 | 110/60 | 110/60 |
| 24 | 1.3 | 2.1 | 3.2 | 4.2 | 5.2 | 155 | 58 | 3.2 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.2 | 12.2 | 20 | 18 | 120/60 | 120/60 |
| 25 | 1.1 | 2.1 | 3.3 | 4.3 | 5.2 | 160 | 58 | 3.1 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.2 | 12,2 | 17 | 14 | 120/60 | 120/60 |
| 26 | 1.1 | 2.1 | 3.3 | 4.3 | 5.2 | 157 | 71 | 3.2 | 4.2 | 5.1 | 6.1 | 7.1 | 8.2 | 9.1 | 10.2 | 11.2 | 12.2 | 19 | 18 | 120/70 | 120/70 |
| 27 | 1.1 | 2.1 | 3.3 | 4.3 | 5.2 | 147 | 71 | 3.3 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.2 | 11.2 | 12.2 | 22 | 20 | 130/70 | 120/70 |
| 28 | 1.2 | 2.1 | 3.2 | 4.3 | 5.2 | 168 | 73 | 3.2 | 4.1 | 5.1 | 6.1 | 7.1 | 8.1 | 9.1 | 10.1 | 11.1 | 12.1 | 16 | 15 | 110/70 | 110/70 |
| 29 | 1.1 | 2.1 | 3.1 | 4.4 | 5.2 | 146 | 58 | 3.1 | 4.1 | 5.2 | 6.3 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 18 | 16 | 140/60 | 130/60 |
| 30 | 1.2 | 2.1 | 3.1 | 4.4 | 5.2 | 150 | 61 | 3.2 | 4.1 | 5.2 | 6.3 | 7.1 | 8.2 | 9.1 | 10.1 | 11.1 | 12.1 | 20 | 18 | 150/80 | 150/80 |

## APPENDIX XXIII

## PHOTOGRAPHS DURING VIRTUAL REALITY THERAPY